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Water-Supply Paper 410

SURFACE WATER SUPPLY OF THE UNITED STATES

1915

PART X. THE GREAT BASIN

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SURFACE WATER SUPPLY OF THE GREAT BASIN, 1915.

AUTHORIZATION AND SCOPE OF WORK.

This volume is one of a series of 14 reports presenting results of measurements of flow made on streams in the United States during the year ending September 30, 1915.

The data presented in these reports were collected by the United States Geological Survey under the following authority contained in the organic law (20 Stat. L., p. 394):

> *Provided*, That this officer [the Director] shall have the direction of the Geological Survey and the classification of public lands and examination of the geological structure, mineral resources, and products of the national domain.

The work was begun in 1888 in connection with special studies relating to irrigation in the arid West. Since the fiscal year ending June 30, 1895, successive sundry civil bills passed by Congress have carried the following item and appropriations:

> For gaging the streams and determining the water supply of the United States, and for the investigation of underground currents and artesian wells, and for the preparation of reports upon the best methods of utilizing the water resources.

Annual appropriations for the fiscal years ending June 30, 1895–1916.

1895	$12,500
1896	20,000
1897 to 1900, inclusive	50,000
1901 to 1902, inclusive	100,000
1903 to 1906, inclusive	200,000
1907	150,000
1908 to 1910, inclusive	100,000
1911 to 1916, inclusive	150,000

In the execution of the work many private and State organizations have cooperated, either by furnishing data or by assisting in collecting data. Acknowledgments for cooperation of the first kind are made in connection with the description of each station affected; cooperation of the second kind is acknowledged on page 14.

Measurements of stream flow have been made at about 3,800 points in the United States and also at many points in Alaska and the Hawaiian Islands. In July, 1915, 1,350 gaging stations were being maintained by the Survey and the cooperating organizations. Many miscellaneous discharge measurements are made at other points. In connection with this work data were also collected in regard to precipitation, evaporation, storage reservoirs, river profiles, and water power in many sections of the country and will be made available in water-supply papers from time to time. Information in regard to publications relating to water resources is presented in the appendix to this report.

DEFINITION OF TERMS.

The volume of water flowing in a stream—the "run-off" or "discharge"—is expressed in various terms, each of which has become associated with a certain class of work. These terms may be divided into two groups—(1) those that represent the rate of flow, as second-feet, gallons per minute, miner's inches, and discharge in second-feet per square mile, and (2) those that represent the actual quantity of water, as run-off in depth of inches, acre-feet, and millions of cubic feet. The principal terms used in this series of reports are second-feet, second-feet per square mile, run-off in inches, and acre-feet. They may be defined as follows:

"Second-feet" is an abbreviation for "cubic feet per second." A second-foot is the rate of discharge of water flowing in a channel of rectangular cross section 1 foot wide and 1 foot deep at an average velocity of 1 foot per second. It is generally used as a fundamental unit from which others are computed by the use of the factors given in the tables of convenient equivalents (pp. 9–11).

"Second-feet per square mile" is the average number of cubic feet of water flowing per second from each square mile of area drained, on the assumption that the run-off is distributed uniformly both as regards time and area.

"Run-off (depth in inches)" is the depth to which an area would be covered if all the water flowing from it in a given period were uniformly distributed on the surface. It is used for comparing run-off with rainfall, which is usually expressed in depth of inches.

An "acre-foot," equivalent to 43,560 cubic feet, is the quantity required to cover an acre to the depth of 1 foot. The term is commonly used in connection with storage for irrigation.

The following terms not in common use are here defined:

"Stage-discharge relation," an abbreviation for the term "relation of gage height to discharge."

"Control," "controlling section," and "point of control," terms used to designate the section or sections of the stream below the gage which determine the stage-discharge relation at the gage. It should be noted that the control may not be the same section or sections at all stages.

The "point of zero flow" for a given gaging station is that point on the gage—the gage height—to which the surface of the river would fall if there were no flow.

CONVENIENT EQUIVALENTS.

The following is a list of convenient equivalents for use in hydraulic computations:

Table for converting discharge in second-feet per square mile into run-off in depth in inches over the area.

Discharge (second-feet per square mile).	Run-off (depth in inches).				
	1 day.	28 days.	29 days.	30 days.	31 days.
1..........	0.03719	1.041	1.079	1.116	1.153
2..........	.07438	2.083	2.157	2.231	2.306
3..........	.11157	3.124	3.236	3.347	3.459
4..........	.14876	4.165	4.314	4.463	4.612
5..........	.18595	5.207	5.393	5.578	5.764
6..........	.22314	6.248	6.471	6.694	6.917
7..........	.26033	7.289	7.550	7.810	8.070
8..........	.29752	8.331	8.628	8.926	9.228
9..........	.33471	9.372	9.707	10.041	10.376

NOTE.—For part of a month multiply the run-off for one day by number of days.

Table for converting discharge in second-feet into run-off in acre-feet.

Discharge (second-feet).	Run-off (acre-feet).				
	1 day.	28 days.	29 days.	30 days.	31 days.
1..........	1.983	55.54	57.52	59.50	61.49
2..........	3.967	111.1	115.0	119.0	123.0
3..........	5.950	166.6	172.6	178.5	184.5
4..........	7.934	222.1	230.1	238.0	246.0
5..........	9.917	277.7	287.6	297.5	307.4
6..........	11.90	333.2	345.1	357.0	368.9
7..........	13.88	388.8	402.6	416.5	430.4
8..........	15.87	444.3	460.2	476.0	491.9
9..........	17.85	499.8	517.7	535.5	553.4

NOTE.—For part of a month multiply the run-off for one day by the number of days.

Table for converting discharge in second-feet into run-off in millions of cubic feet.

Discharge (second-feet).	Run-off (millions of cubic feet).				
	1 day.	28 days.	29 days.	30 days.	31 days.
1..........	0.0864	2.419	2.506	2.592	2.678
2..........	.1728	4.838	5.012	5.184	5.356
3..........	.2592	7.257	7.518	7.776	8.034
4..........	.3456	9.676	10.024	10.368	10.712
5..........	.4320	12.095	12.530	12.960	13.390
6..........	.5184	14.514	15.036	15.552	16.068
7..........	.6048	16.933	17.542	18.144	18.746
8..........	.6912	19.352	20.048	20.736	21.424
9..........	.7776	21.771	22.554	23.328	24.102

NOTE.—For part of a month multiply the run-off for one day by the number of days.

Table for converting discharge in second-feet into run-off in millions of gallons.

Discharge (second-feet).	Run-off (millions of gallons).				
	1 day.	28 days.	29 days.	30 days.	31 days.
1	0.6463	18.10	18.74	19.39	20.04
2	1.293	36.20	37.48	38.78	40.08
3	1.939	54.30	56.22	58.17	60.12
4	2.585	72.40	74.96	77.56	80.16
5	3.232	90.50	93.70	96.95	100.2
6	3.878	108.6	112.4	116.3	120.2
7	4.524	126.7	131.2	135.7	140.3
8	5.171	144.8	149.9	155.1	160.3
9	5.817	162.9	168.7	174.5	180.4

NOTE.—For part of a month multiply the run-off for one day by the number of days.

Table for converting velocity in feet per second into velocity in miles per hour.

[1 foot per second=0.681818 mile per hour, or two-thirds mile per hour, very nearly; 1 mile per hour=1.4666 feet per second. In computing the table the figures 0.68182 and 1.4667 were used.]

Feet per second (units).	Miles per hour for tenths of foot per second.									
	0	1	2	3	4	5	6	7	8	9
0	0.000	0.068	0.136	0.205	0.273	0.341	0.409	0.477	0.545	0.614
1	.682	.750	.818	.886	.995	1.02	1.09	1.16	1.23	1.30
2	1.36	1.43	1.50	1.57	1.64	1.70	1.77	1.84	1.91	1.98
3	2.05	2.11	2.18	2.25	2.32	2.39	2.45	2.52	2.59	2.66
4	2.73	2.80	2.86	2.93	3.00	3.07	3.14	3.20	3.27	3.34
5	3.41	3.48	3.55	3.61	3.68	3.75	3.82	3.89	3.95	4.02
6	4.09	4.16	4.23	4.30	4.36	4.43	4.50	4.57	4.64	4.70
7	4.77	4.84	4.91	4.98	5.05	5.11	5.18	5.25	5.32	5.39
8	5.45	5.52	5.59	5.66	5.73	5.80	5.86	5.93	6.00	6.07
9	6.14	6.20	6.27	6.34	6.41	6.48	6.55	6.61	6.68	6.75

Table for converting discharge in second-feet into theoretical horsepower per foot of fall.

[1 second-foot=0.1136 theoretical horsepower per foot of fall. Weight of 1 cubic foot of water=62.5 pounds.]

Tens.	Units.									
	0	1	2	3	4	5	6	7	8	9
0	0.00	0.114	0.227	0.341	0.454	0.568	0.682	0.795	0.909	1.02
1	1.14	1.25	1.36	1.48	1.59	1.70	1.82	1.93	2.04	2.16
2	2.27	2.39	2.50	2.61	2.73	2.84	2.95	3.07	3.18	3.29
3	3.41	3.52	3.64	3.75	3.86	3.98	4.09	4.20	4.32	4.43
4	4.54	4.66	4.77	4.88	5.00	5.11	5.23	5.34	5.45	5.57
5	5.68	5.79	5.91	6.02	6.13	6.25	6.36	6.48	6.59	6.70
6	6.82	6.93	7.04	7.16	7.27	7.38	7.50	7.61	7.72	7.84
7	7.96	8.07	8.18	8.29	8.41	8.52	8.63	8.75	8.86	8.97
8	9.09	9.20	9.32	9.43	9.54	9.66	9.77	9.88	10.0	10.1
9	10.2	10.3	10.5	10.6	10.7	10.8	10.9	11.0	11.1	11.2

1 second-foot equals 40 California miner's inches (law of March 23, 1901).

1 second-foot equals 38.4 Colorado miner's inches.

1 second-foot equals 40 Arizona miner's inches.

1 second-foot equals 7.48 United States gallons per second; equals 448.8 gallons per minute; equals 646,317 gallons for one day.

1 second-foot for one year (365 days) covers 1 square mile 1.131 feet or 13.572 inches deep.

1 second-foot for one year (365 days) equals 31,536,000 cubic feet.

1 second-foot equals about 1 acre-inch per hour.

1 second-foot for one day equals 86,400 cubic feet.

1,000,000,000 (1 United States billion) cubic feet equals 11,570 second-feet for one day.
1,000,000,000 cubic feet equals 414 second-feet for one 28-day month.
1,000,000,000 cubic feet equals 399 second-feet for one 29-day month.
1,000,000,000 cubic feet equals 386 second-feet for one 30-day month.
1,000,000,000 cubic feet equals 373 second-feet for one 31-day month.
100 California miner's inches equals 18.7 United States gallons per second.
100 California miner's inches for one day equals 4.96 acre-feet.
100 Colorado miner's inches equals 2.60 second-feet.
100 Colorado miner's inches equals 19.5 United States gallons per second.
100 Colorado miner's inches for one day equals 5.17 acre-feet.
100 United States gallons per minute equals 0.223 second-foot.
100 United States gallons per minute for one day equals 0.442 acre-foot.
1,000,000 United States gallons per day equals 1.55 second-feet.
1,000,000 United States gallons equals 3.07 acre-feet.
1,000,000 cubic feet equals 22.95 acre-feet.
1 acre-foot equals 325,850 gallons.
1 inch deep on 1 square mile equals 2,323,200 cubic feet.
1 inch deep on 1 square mile equals 0.0737 second-foot per year.
1 foot equals 0.3048 meter.
1 mile equals 1.60935 kilometers.
1 mile equals 5,280 feet.
1 acre equals 0.4047 hectare.
1 acre equals 43,560 square feet.
1 acre equals 209 feet square, nearly.
1 square mile equals 2.59 square kilometers.
1 cubic foot equals 0.0283 cubic meter.
1 cubic foot of water weighs 62.5 pounds.
1 cubic meter per minute equals 0.5886 second-foot.
1 horsepower equals 550 foot-pounds per second.
1 horsepower equals 76.0 kilogram-meters per second.
1 horsepower equals 746 watts.
1 horsepower equals 1 second-foot falling 8.80 feet.
1⅓ horsepower equal about 1 kilowatt.

To calculate water power quickly: $\frac{\text{Sec.-ft.} \times \text{fall in feet}}{11}$ = net horsepower on water wheel realizing 80 per cent of theoretical power.

EXPLANATION OF DATA.

The data presented in this report cover the year beginning October 1, 1914, and ending September 30, 1915. At the first of January in most parts of the United States much of the precipitation in the preceding three months is stored as ground water, in the form of snow, or in ponds, lakes, and swamps, and this stored water passes off in the streams during the spring break-up; at the end of September, on the other hand, the only stored water available for run-off is possibly a small quantity in the ground; therefore the run-off for a year beginning with October 1 is practically all derived from precipitation in that year.

The base data collected at gaging stations consist of records of stage, measurements of discharge, and general information used to supplement the gage heights and discharge measurements in determining the daily flow. The records of stage are obtained either from direct readings on a staff gage or from a water-stage recorder that gives a continuous record of the fluctuations. Measurements of discharge are made with a current meter by the general methods outlined in standard textbooks on the measurement of river discharge. (See Pls. I and II.)

From the discharge measurements rating tables are prepared that give the discharge for any stage, and these rating tables, when applied to the gage heights, give the discharge from which the daily, monthly, and yearly mean discharge is determined.

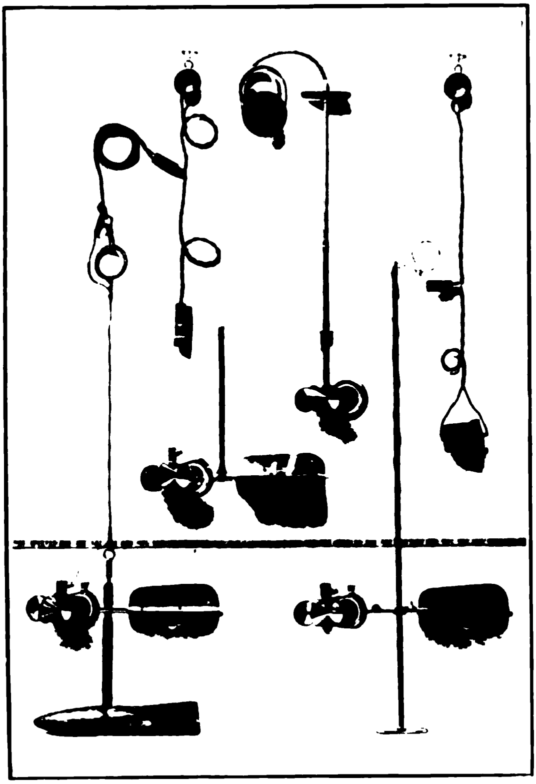
The data presented for each gaging station in the area covered by this report comprise a description of the station, a table giving results of discharge measurements, a table showing the daily discharge of the stream, and a table of monthly and yearly discharge and run-off.

If the base data are insufficient to determine the daily discharge, tables giving daily gage heights and results of discharge measurements are published.

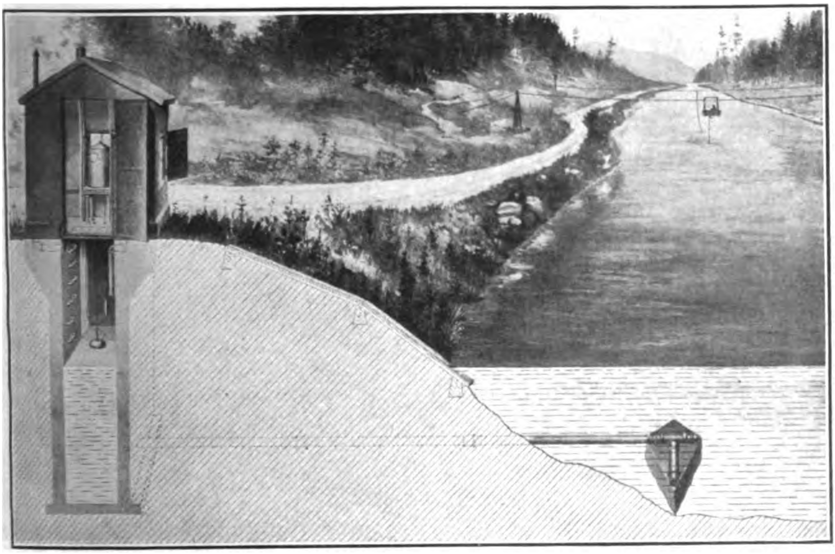
The description of the station gives, in addition to statements regarding location and equipment, information in regard to any conditions that may affect the constancy of the stage-discharge relation, covering such subjects as the occurrence of ice, the use of the stream for log driving, shifting of channel, and the cause and effect of backwater; it gives also information as to diversions that decrease the flow at the gage, artificial regulation, maximum and minimum recorded stages, and the accuracy of the records.

The table of daily discharge in general gives the discharge in second-feet corresponding to the mean of the gage heights read each day. At stations on streams subject to sudden or rapid diurnal fluctuation the discharge obtained from the rating table and the mean daily gage height may not be the true mean discharge for the day. If such stations are equipped with water-stage recorders the mean daily discharge may be obtained by weighting discharge for parts of the day.

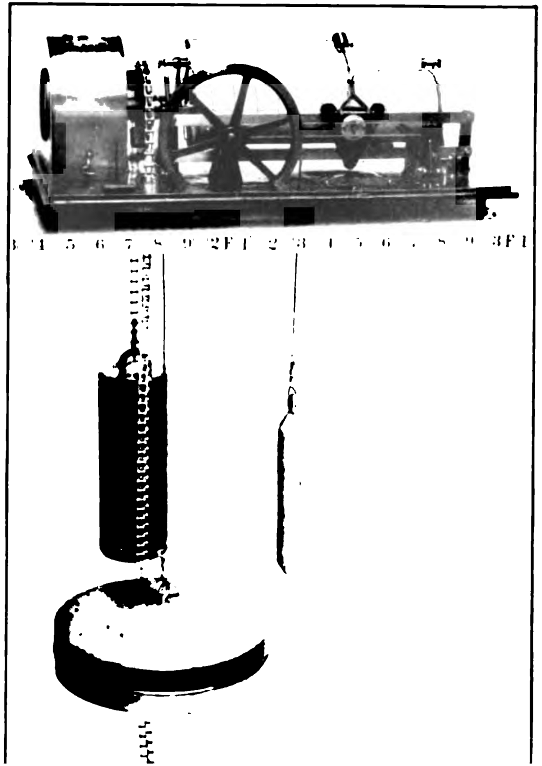
In the table of monthly discharge the column headed "Maximum" gives the mean flow for the day when the mean gage height was highest. As the gage height is the mean for the day it does not indicate correctly the stage when the water surface was at crest height and the corresponding discharge was consequently larger than given in the maximum column. Likewise, in the column headed "Minimum" the quantity given is the mean flow for the day when the mean gage height was lowest. The colmun headed "Mean" is the average flow in cubic feet for each second during the month. On this average flow computations recorded in the remaining columns, which are defined on page 8, are based.

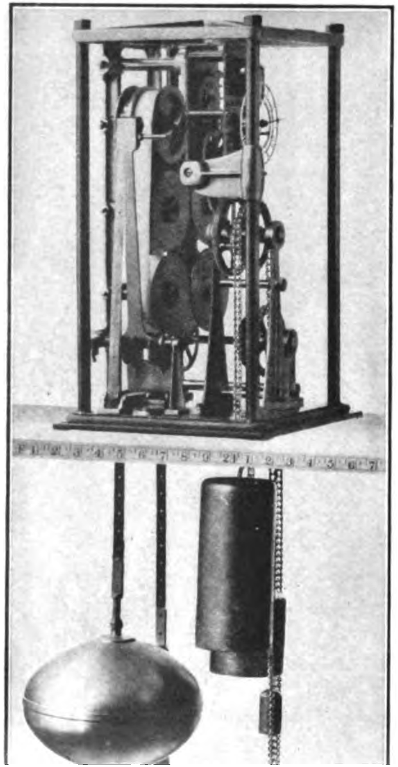


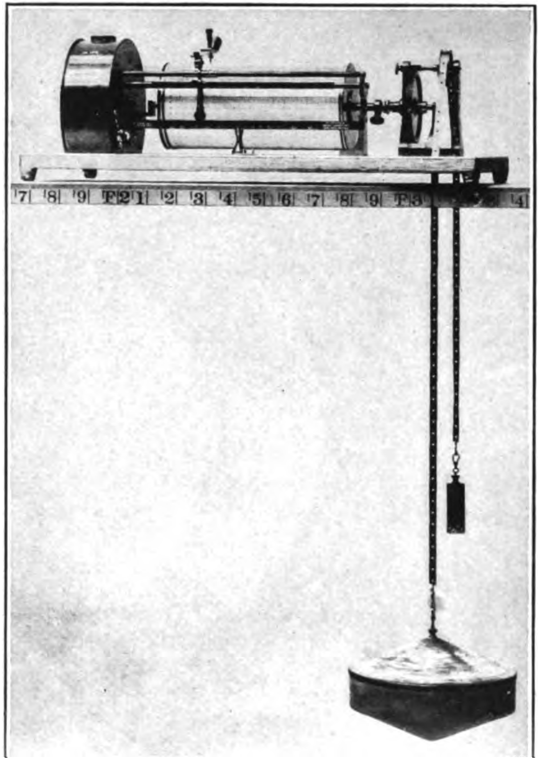
A. PRICE CURRENT METERS.



B. TYPICAL GAGING STATION.







ACCURACY OF FIELD DATA AND COMPUTED RESULTS.

The accuracy of stream-flow data depends primarily (1) on the permanency of the stage-discharge relation and (2) on the accuracy of observation of stage, measurements of flow, and interpretation of records.

Footnotes added to the daily discharge tables give information regarding the probable accuracy of the rating tables used, and an accuracy column is inserted in the monthly discharge table. For the rating tables, "well defined" indicates, in general, that the rating is probably accurate within 5 per cent; "fairly well defined," within 10 per cent; "poorly defined" or "approximate," within 15 to 25, per cent. These notes are very general and are based on the plotting of the individual measurements with reference to the mean rating curve.

The letter in the column headed "Accuracy," in the table showing monthly discharge, rates the accuracy of the monthly mean and not that of the estimate of maximum or minimum discharge or the discharge for any one day. The rating is determined by considering the accuracy of the rating curve, the probable reliability of the observer, the number of gage readings per day, the range of the fluctuation in stage, and local conditions. In this column, A indicates that the mean monthly flow is probably accurate within 5 per cent; B, within 10 per cent; C, within 15 per cent; D, within 25 per cent. Special conditions are covered by footnotes.

The monthly means for any station may represent with high accuracy the quantity of water flowing past the gage, but the figures showing discharge per square mile and depth of run-off in inches may be subject to gross errors caused by the inclusion of large noncontributing districts in the measured drainage area, by lack of information concerning water diverted for irrigation or other use, or by inability to interpret the effect of artificial regulation of the flow of the river above the station. "Second-feet per square mile" and "Run-off (depth in inches)" are therefore not computed if such errors appear probable. The computations are also omitted for stations on streams draining areas in which the annual rainfall is less than 20 inches. All figures representing "second-feet per square mile" and "run-off (depth in inches)" previously published by the Survey should be used with caution because of possible inherent sources of error not known to the Survey.

The table of monthly discharge gives only a general idea of the flow at the station and should not be used for other than preliminary estimates; the tables of daily discharge allow more detailed studies of the variation in flow. It should be borne in mind, however, that the observations in each succeeding year may be expected to throw new light on data previously published.

COOPERATION.

During the year ending September 30, 1915, the work in Utah, Nevada, California, and Oregon has been done under cooperative agreements between the United States Geological Survey and the respective States.

Cooperation with the States is effected under contracts which are made between the Director of the Federal Survey and the State engineers or other officials and are authorized by legislative acts appropriating moneys. The State contracts are essentially of the same order, the principal provisions being substantially as follows:

1. The United States Geological Survey retains direct supervision of the field work and the preparation of the data for publication.
2. The Federal Survey retains possession of field notes, maps, and other material collected, but this material is open at all times to inspection by the State officials, and if not satisfactory the agreements can be terminated at any time.
3. The salaries of gage observers and engineers and the traveling and field expenses of the engineers are divided between the two parties in some manner agreed upon, the accounts being rendered monthly in accordance with the regulations of the Federal Survey.
4. The streams and localities in which investigations shall be made are determined by conference between the State officials and the representatives of the United States Geological Survey.
5. The cost of publication is borne entirely by the Federal Survey.

In general, the cooperative agreements specify that the United States Geological Survey shall allot from its appropriation a sum equal to that appropriated from State funds.

Special acknowledgments are due to W. D. Beers, State engineer of Utah, W. M. Kearney, State engineer of Nevada, W. F. McClure, State engineer of California, George C. Pardee, chairman California Conservation Commission, and John H. Lewis, State engineer of Oregon, for the very efficient manner in which they have represented their States in the cooperative investigations.

Acknowledgments are also due to the officials and employees of the United States Reclamation Service, the United States Forest Service, the United States Office of Indian Affairs, and the United States Weather Bureau for free use of data collected by them.

Financial assistance has been rendered by Department of Public Service, Los Angeles, Cal.; Southern Pacific Co.; Reno Water, Land & Light Co.; Union Land & Cattle Co.; Beaver County Irrigation Co.; Salt Lake City Corporation; Logan River Water Users' Association; Blacksmith Fork Water User's Association; Uinta Development Co.; Truckee River General Electric Co.; Elko-Lamoille Light & Power Co.; Humboldt-Lovelocks Irrigation, Light & Power Co.;

Chewacan Land & Cattle Co.; Northwest Townsite Co.; Blitzen Valley Land Co.; various canal and reservoir companies operating in Sevier River basin; Prof. Ray B. West, Utah State Agricultural College; George L. Swendsen; Edmund Cazier; G. M. Southward; C. B. McConnell; and Mrs. Morgan Hill.

DIVISION OF WORK.

Data for stations in Idaho were collected and prepared for publication under the direction of G. C. Baldwin, district engineer, assisted by A. B. Purton, A. W. Harrington, L. W. Roush, Miss E. H. Haugse, and H. J. Dean.

For stations in Utah and Nevada the data were collected under the direction of E. A. Porter, district engineer, and prepared for publication under the direction of E. A. Porter and C. C. Jacob, district engineers, assisted by Lynn Crandall, A. B. Purton, L. W. Jordan, J. J. Sanford, C. W. Bennett, and Miss Ruby Christenson.

For stations in California the data were collected and prepared for publication under the direction of H. D. McGlashan, district engineer, assisted by J. E. Jones, H. J. Tompkins, Thad McKay, F. B. Clark, J. H. Morgan, Charles Leidl, J. F. Kunesh, and M. B. Trelease.

For stations in Oregon the data were collected and prepared for publication under the direction of F. F. Henshaw, district engineer, assisted by J. E. Stewart, P. V. Hodges, and C. L. Batchelder.

The manuscript was assembled and reviewed by H. J. Dean and E. L. Williams.

GAGING-STATION RECORDS.

GREAT SALT LAKE BASIN.

GAGES ON GREAT SALT LAKE.

Location.—At Saltair, on the southeastern shore of the lake about 15 miles west of Salt Lake City, and at Midlake, on the Lucin cut-off of the Southern Pacific Railroad, about 30 miles west of Ogden, Weber County.

Records available.—September 14, 1875, to December 15, 1899; March to July, 1904; October 1, 1912, to September 30, 1915. Records have appeared in publications of United States Geological Survey, as follows: Gage heights, September 14, 1875, to January 4, 1890, in Monograph I, Lake Bonneville, by G. K. Gilbert; gage heights September, 1875, to December, 1891, in the Thirteenth Annual Report of the Director, Part III; gage heights, September 14, 1875, to December 15, 1899, in Water-Supply Paper 38; gage heights, March 12 to July 21, 1904, in Water-Supply Paper 133; since October 1, 1912, gage heights have been published in water-supply papers. Chart showing variation in level of Great Salt Lake and monthly and annual precipitation in Great Salt Lake basin from 1850 to 1913, compiled from chart in office of chief engineer of Oregon Short Line Railroad, Salt Lake City, Utah, published by United States Geological Survey in Water-Supply Paper 330.

Gages.—Midlake gage read August 15, 1902, to September 30, 1915; Saltair gage, July 1, 1903, to September 30, 1915. The first gage was installed at Blackrock in September, 1875, and was used until October, 1877. A gage at Farmington was used from November, 1877, to November, 1879, and one at Lake Shore from November, 1879, to September, 1881. Gages at Garfield Landing were used April, 1881, to December, 1899. In 1916 E. C. LaRue, hydraulic engineer, United States Geological Survey, installed a gage at Lake Point, and by means of comparative readings for one month determined the relation between this gage and the gages at Saltair and Midlake. The elevation of the zero of the gage at Lake Point was determined from United States Geological Survey bench marks, the elevations of which had been adjusted in 1912 by the United States Coast and Geodetic Survey from precise leveling. From the Lake Point gage and the table of elevations given by Mr. Gilbert in Monograph I, Mr. LaRue determined the elevations above mean sea level of the zeros of the various gages to be as follows:

	Feet.
Blackrock gage	4, 208. 30
Farmington gage	4, 206. 80
Lake Shore	4, 203. 00
Garfield Landing (U. S. G. S.)	4, 198. 40
Garfield (Marcus E. Jones)	4, 198. 40
Midlake	4, 198. 01
Saltair	4, 196. 77

Cooperation.—Readings on the Midlake gage are furnished by the Southern Pacific Co.; readings on the Saltair gage by the United States Weather Bureau.

Gage height, in feet, of Great Salt Lake, Utah, for the year ending Sept. 30, 1915.

Day.	Gage height.		Day.	Gage height.		Day.	Gage height.	
	Saltair gage.	Midlake gage.		Saltair gage.	Midlake gage.		Saltair gage.	Midlake gage.
Oct. 1	5.5	4.3	Mar. 1	6.0	4.8	Aug. 1	5.5	4.2
15	5.6	4.2	15	6.1	4.9	15	5.3	4.3
Nov. 1	5.6	4.2	Apr. 1	6.2	5.0	Sept. 1	5.0	3.8
15	5.6	4.2	15	6.3	5.1	15	4.8	3.5
Dec. 1	5.5	4.2	May 1	6.3	5.1			
15	5.5	4.2	15	6.3	5.0			
Jan. 1	5.6	4.2	June 1	6.3	5.0			
15	5.6	4.4	15	6.2	5.0			
Feb. 1	5.7	4.5	July 1	6.0	4.8			
15	5.8	4.6	15	5.8	4.5			

BEAR RIVER BASIN.

BEAR RIVER NEAR EVANSTON, WYO.

Location.—In sec. 1, T. 15 N., R. 121 W., 300 feet above highway bridge, and 3½ miles northwest of Evanston, Uinta County. Nearest tributary, a small stream from the southwest half a mile above.

Drainage area.—645 square miles, measured on base map of Wyoming and topographic maps.

Records available.—October 26, 1913, to September 30, 1915.

Gage.—Chain gage on left bank 300 feet above bridge; read twice daily by Mrs. Marion McClure.

Discharge measurements.—Made from cable just below gage or by wading.

Channel and control.—Bed composed of coarse gravel. Control at riffle a short distance below gage; permanent. Left bank is overflowed at stage of about 5 feet; right bank subject to overflow at stages above 5 feet.

Extremes of discharge.—Maximum stage recorded during year, 4.2 feet at 8.30 a. m. June 2 (discharge, 1,240 second-feet); minimum stage recorded 8.30 a. m. August 15, when observer reported channel nearly dry.

Winter flow.—Stage-discharge relation seriously affected by ice; observations discontinued during winter.

Diversions.—Prior to December 31, 1916, there were adjudicated diversions of 249 second-feet from Bear River above station. Below there were adjudicated diversions of 516 second-feet.

Regulations.—None.

Accuracy.—Records considered excellent.

Discharge measurements of Bear River near Evanston, Wyo., during the year ending Sept. 30, 1915.

[Made by R. H. Fletcher.]

Date.	Gage height.	Discharge.
	Feet.	*Sec.-ft.*
May 11	2.14	265
June 15	3.10	651

Daily discharge, in second-feet, of Bear River near Evanston, Wyo., for the year ending Sept. 30, 1915.

Day.	Oct.	Nov.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.
1	46	100	....	300	600	695	470	29	25
2	43	112	....	390	410	1,240	410	30	25
3	72	106	....	955	350	1,010	410	30	26
4	124	102	....	1,010	333	1,060	390	28	27
5	119	87	....	795	316	1,010	370	31	33
6	82	82	....	430	283	1,060	430	34	34
7	85	85	....	370	268	795	350	40	33
8	140	90	....	390	268	745	300	37	34
9	216	74	....	370	268	845	252	32	34
10	184	57	....	252	283	1,060	195	31	35
11	187	55	....	252	268	1,120	209	29	43
12	182	57	....	252	316	1,060	195	30	127
13	126	52	....	252	390	900	182	32	217
14	140	60	....	283	600	745	167	30	53
15	140	47	....	333	600	645	119	18	53
16	121	36	....	390	645	845	92	27	51
17	126	....	....	390	745	1,060	85	29	62
18	124	....	....	450	795	955	66	29	65
19	126	....	....	555	795	955	58	26	55
20	117	....	....	532	745	900	53	26	52
21	126	....	....	510	470	900	41	26	48
22	135	....	....	450	430	900	36	26	47
23	117	....	....	410	410	1,010	36	25	48
24	112	....	....	430	390	1,010	36	25	48
25	108	....	268	370	510	795	40	26	59
26	108	....	228	410	470	845	32	22	169
27	114	....	510	955	430	600	34	23	182
28	119	....	510	578	390	600	33	26	141
29	114	....	390	695	510	510	32	23	123
30	100	....	223	845	695	430	31	25	109
31	100	....	223	....	645	....	30	25	....

Note.—Discharge determined from well-defined rating curve.

Monthly discharge of Bear River near Evanston, Wyo., for the year end September 30, 1915.

Month.	Discharge in second-feet.			Run-off (total in acre-feet).	A r
	Maximum.	Minimum.	Mean.		
October	216	43	121	7,440	A
November 1-16	112	36	75.1	2,380	I
March 25-31	510	223	335	4,650	I
April	1,010	252	487	29,000	A
May	795	268	472	29,000	A
June	1,240	430	877	52,200	A
July	470	30	167	10,300	A
August	40	18	28.1	1,730	A
September	217	25	68.8	4,090	A

BEAR RIVER AT HARER, IDAHO.

Location.—In the SE. ¼ sec. 22, T. 14 S., R. 45 E., about three-fourths n north of Harer Siding, on the Oregon Short Line Railroad, Bear L County, 7 miles by road above Dingle, and 14 miles southeast of Montpel

Drainage area.—2,780 square miles (determination furnished by Utah Powe Light Co.).

Records available.—June 21, 1913, to September 30, 1915.

Gage.—Stevens water-stage recorder on right bank; installed August 24, 19 Inspected by employees of Utah Power & Light Co. Inclined staff on ri bank, about 1,500 feet downstream, used prior to August 24, 1914. T gages have different controls.

Discharge measurements.—Made from cable just below gage or by wading

Channel and control.—Bed composed of clean hard material; banks subject overflow at extreme high stages. Control permanent during 1915 and 19

Winter flow.—Stage-discharge relation seriously affected by ice from Nov ber to March; discharge determined from numerous current-meter measu ments and from charts of water-stage recorder.

Extremes of discharge.—Maximum stage recorded during year, 5.34 feet 11 a. to 7 p. m. June 7 (discharge 1,120 second-feet); minimum stage, 2.90 f 2 a. m. to 1 p. m. September 3 (discharge, 127 second-feet).

1913–1915: Maximum stage recorded, 11.12 feet at 9.25 a. m. May 1914 (discharge, 3,450 second-feet); minimum stage, 2.90 feet 2 a. m. 1 p. m. September 3, 1915 (discharge, 127 second-feet).

Diversions.—No large diversion above station.

Accuracy.—Stage-discharge relation permanent except during winter, when was affected by ice. Rating curve well defined above 300 second-feet, measurements made in 1916 and those made by Survey engineers in 19 Operation of recorder satisfactory except for short periods during Decem to March. Daily discharge ascertained by applying to rating table m daily gage heights determined by inspection of gage-height graph. Reco good except those for November to March, which are subject to error ow to effect of ice.

Cooperation.—Gage-height record and most of discharge measurements f nished by Utah Power & Light Co.

Discharge measurements of Bear River at Harer, Idaho, during the year ending Sept. 30, 1915.

Date.		Made by—	Gage height.	Discharge.	Date.		Made by—	Gage height.	Discharge.
			Feet.	*Sec.-ft.*				*Feet.*	*Sec.-ft.*
Oct.	6	Karl Gilgen	3.61	335	June	1	Karl Gilgen	4.10	580
	13	do	3.69	366		7	A. W. Harrington	5.34	1,140
	20	do	3.74	389		8	Karl Gilgen	5.19	1,090
	29	do	3.70	376		15	do	4.90	955
Nov.	10	do	3.64	337		23	do	4.51	807
	24	do	[a]3.90	335		30	do	4.27	652
Dec.	1	do	[a]3.84	251	July	10	H. L. Stoner	3.87	453
	8	do	[a]3.81	305		20	Stoner and Gilgen	3.61	360
	15	do	[a]3.59	198		26	Karl Gilgen	3.38	293
	24	do	[a]3.39	165	Aug.	3	do	3.23	239
Jan.	6	do	[a]3.61	203		10	do	3.16	222
	20	do	[a]3.66	214		17	do	3.09	203
Feb.	3	do	[a]3.71	217		24	do	3.01	176
	17	do	[a]3.68	226		31	do	2.93	146
Mar.	5	do	[a]3.84	279	Sept.	7	do	3.06	188
	27	do	4.20	623		16	do	3.08	197
Apr.	9	do	4.44	738		23	do	3.04	195
	26	do	4.22	637		28	A. W. Harrington	3.28	238
May	10	do	3.99	518		29	Karl Gilgen	3.23	242
	15	do	3.63	372					
	25	do	4.01	589					

[a] Stage-discharge relation affected by ice.

NOTE.—H. L. Stoner and Karl Gilgen are employees of Utah Power & Light Co. Measurements made by Gilgen prior to April, 1916, not used in preparing the rating curve, as later measurements indicate that the results obtained by Gilgen were too large.

Daily discharge, in second-feet, of Bear River at Harer, Idaho, for the year ending Sept. 30, 1915.

Day.	Oct.	Nov.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.
1	318	382		579	588	544	615	234	135
2	318	382		592	570	552	579	228	133
3	326	382		592	540	574	544	221	138
4	333	378		615	502	592	519	224	147
5	337	375		615	473	776	502	221	158
6	348	371		615	457	1,010	490	218	166
7	356	363		707	445	1,080	481	221	172
8	363	359		730	449	1,050	477	215	169
9	382	359		707	531	1,030	469	212	215
10	394	363		661	514	1,050	457	203	195
11	398	359		661	445	1,010	481	203	180
12	378	356		661	363	960	552	203	175
13	382	367		638	371	868	490	200	180
14	394	371		615	367	799	453	198	183
15	409	337		615	359	891	429	189	180
16	417			592	359	914	409	189	177
17	417			615	352	868	394	180	175
18	409		363	592	340	822	378	180	174
19	402		378	638	340	730	375	177	173
20	402		445	661	363	730	356	177	171
21	402		445	684	382	845	346	175	169
22	398		490	684	406	753	340	172	167
23	394		535	707	445	730	321	166	166
24	394		580	661	465	730	300	158	163
25	394		630	615	506	730	282	155	180
26	394		680	592	531	684	269	155	218
27	394		660	583	548	638	265	152	249
28	394		638	548	540	638	262	149	234
29	386		579	561	581	638	259	144	221
30	378		570	566	535	615	253	141	218
31	378		566		535		243	135	

NOTE.—Gage not working properly Mar. 22-27 and Sept. 18-22; discharge estimated. Stage-discharge relation affected by ice Nov. 16 to Mar. 17; mean discharge estimated from current meter measurements gage-height record, and climatic data, as follows: Nov. 16-30, 320 second-feet; Dec. 1 to Jan. 31, 200 second-feet; Feb. 1-28, 210 second-feet; and Mar. 1-17, 280 second-feet.

Monthly discharge of Bear River at Harer, Idaho, for the year endin 30. 1915.

Month.	Discharge in second-feet.			Run-of (total i acre-feet
	Maximum.	Minimum.	Mean.	
October	417	318	380	23,4
November			a343	20,4
December			a200	12,3
January			a200	12,3
February			a210	11,7
March	680		a397	24,4
April	730	548	630	37,5
May	588	340	457	28,10
June	1,080	544	795	47,30
July	615	243	406	25,00
August	234	135	187	11,50
September	249	133	179	10,70
The year	1,080	133	365	265,00

a See footnote to table of daily discharge.

BEAR RIVER AT DINGLE, IDAHO.

Location.—In sec. 7, T. 14 S., R. 45 E., 100 yards south of Oregon Shor Railroad, half a mile southeast of Dingle Station, Bear Lake Coun miles above outlet of Bear Lake.

Drainage area.—2,890 square miles.

Records available.—May 9, 1903, to December 31, 1914, when statio discontinued.

Gage.—Inclined staff on right bank; read by M. K. Hopkins.

Discharge measurements.—Made from cable about 30 feet below gage.

Channel and control.—Bed composed of gravel; control not perm Banks high and not subject to overflow.

Winter flow.—River usually frozen over from December to March; ice s and about 15 inches thick; stage-discharge relation seriously affected.

Extremes of discharge.—1903–1914: Maximum mean daily discharge, second-feet May 26 and June 1, 1907; minimum mean daily dischar second feet January 1, 1904.

Diversions.—Several canals divert above station for irrigation. During s of 1911 Telluride Power Co. began to divert about 2 miles above st for storage in a branch of Bear Lake, known as Mud or North Lake. water, when released, returns to the river above the Alexander Statio

Accuracy.—Gage read three times a week to half-tenths. Discharge mined by applying gage heights to rating table and interpolating for on which gage was not read, except December 10–31, when stage-disc relation was affected by ice. Mean discharge for this period esti from observer's notes and climatic data. Rating curve fairly well de Records for October and November fair and December poor.

No discharge measurements made during the period.

Daily discharge, in second-feet, of Bear River at Dingle, Idaho, for the p Oct. 1 to Sept. 30, 1914.

Day.	Oct.	Nov.	Dec.	Day.	Oct.	Nov.	Dec.	Day.	Oct.	Nov.
1	260	325	232	11	319	302		21	325	276
2	265	325	257	12	314	291		22	325	260
3	270	325	283	13	308	308		23	331	276
4	275	325	308	14	316	325		24	337	291
5	280	325	297	15	325	331		25	343	291
6	286	325	286	16	344	337		26	337	291
7	291	325	275	17	363	343		27	331	291
8	302	325	275	18	350	326		28	325	291
9	314	325	275	19	338	308		29	325	271
10	325	314		20	325	292		30	325	252
								31	325	

Note.—Gage read three times a week; discharge interpolated for other days, except Dec. 10–31, stage-discharge relation was affected by ice. Mean discharge Dec. 10–31, estimated 200 second-feet.

Monthly discharge of Bear River at Dingle, Idaho, for the period Oct. 1 to Dec. 31, 1914.

Month.	Discharge in second-feet.			Run-off (total in acre-feet).	Accuracy.
	Maximum.	Minimum.	Mean.		
October	363	260	316	19,400	B.
November	343	252	306	18,200	B.
December	308	....	[a] 222	13,600	D.
The period	....	....	....	51,200	

[a] See footnote to table of daily discharge.

BEAR RIVER AT ALEXANDER, IDAHO.

Location.—In the NW. ¼ sec. 18, T. 9 S., R. 41 E., about half a mile upstream from the post office at Alexander, Bannock County, 4 miles above intake of Last Chance Canal, 6 miles above plant of Utah Power & Light Co., near Grace, and 30 miles below confluence of Bear Lake Outlet and Bear River.

Drainage area.—Not measured.

Records available.—March 27, 1911, to September 30, 1915.

Gage.—Stevens water-stage recorder on right bank installed September 15, 1914; inspected by employees of Utah Power & Light Co. Gages previously used as follows: March 27 to November 14, 1911, an inclined staff on right bank, 1,000 feet upstream from present gage; November 15, 1911, to September 15, 1914, an inclined and vertical staff at present site. Present gage at same datum as staff gage used November 15, 1911, to September 14, 1914.

Discharge measurements.—Made from cable about 400 feet above gage.

Channel and control.—Bed composed of gravel and sand. One channel at all stages. Control permanent during 1915 and 1916.

Winter flow.—Stage-discharge relation seriously affected by ice.

Extremes of discharge.—Maximum stage recorded during year, 13.8 feet at 3 p. m. December 22, 1914 (discharge indeterminate as stage-discharge relation was affected by ice); minimum stage, 5.19 feet at 9 a. m. September 20 (discharge, 410 second-feet).

1911–1915: Maximum stage recorded, 13.8 feet at 3 p. m. December 22, 1914 (maximum discharge of 3,940 second-feet occurred May 25–28, 1914, at gage height of 9.5 feet); minimum stage recorded, 5.19 feet at 9 a. m. September 20, 1915 (discharge, 410 second-feet).

Diversions.—Water is diverted above station for irrigation and storage for power development.

Regulation.—Water diverted from Bear River is stored during the spring in North or Mud Lake and released for power development during summer; this water is returned to Bear River about 30 miles above station.

Accuracy.—Stage-discharge relation permanent except during winter. Operation of water-stage recorder satisfactory except for a few days in December, January, and May. Rating curve well defined between 500 and 3,500 second-feet, by measurements made by power company engineers in 1916 and by Survey engineers in 1913 to 1915. Discharge determined by applying to rating table mean daily gage heights obtained by inspection of recorder charts, except during December to February, when stage-discharge relation was affected by ice. Records good except for December, January, and February.

Cooperation.—Gage-height record and large number of measurements furnished by Utah Power & Light Co.

Discharge measurements of Bear River at Alexander, Idaho, during the year ending Sept. 30, 1915.

Date.		Made by—	Gage height.	Discharge.	Date.		Made by—	Gage height.	Discharge.
			Feet.	*Sec.-ft.*				*Feet.*	*Sec.-ft.*
Oct.	3	Karl Gilgen	6.18	993	Apr.	22	Karl Gilgen	6.42	1,170
	10	do	6.32	1,140		23	G. C. Baldwin	6.40	1,090
	17	do	6.31	1,110		29	Karl Gilgen	5.70	711
	24	do	5.94	859	May	6	do	5.59	646
Nov.	1	do	5.93	873		13	do	5.36	528
	14	do	5.92	874		24	do	5.41	550
	28	do	5.93	875		29	do	5.43	579
Dec.	5	do	5.93	853	June	5	do	5.39	564
Jan.	9	do	[a]8.76	976		6	A. W. Harrington	5.64	644
	16	do	[a]8.25	895		12	Karl Gilgen	5.48	595
	24	do	[a]7.04	764		22	do	5.59	675
	26	L. W. Roush	[a]6.64	728		29	do	5.97	866
	30	Karl Gilgen	[a]6.37	848	July	12	H. L. Stoner	6.05	916
Feb.	6	do	[a]6.14	823		27	G. C. Baldwin	6.05	902
	13	do	6.02	924		30	Karl Gilgen	5.90	871
	20	do	5.85	865	Aug.	4	do	5.78	786
	27	do	5.93	893		13	do	5.69	722
Mar.	9	do	5.78	808		21	do	5.72	776
	16	do	6.09	950		28	do	5.69	740
	19	do	6.17	991	Sept.	4	do	5.93	858
	22	do	6.08	961		14	do	5.51	631
	30	do	5.94	882		20	do	5.19	470
Apr.	6	do	5.95	884		24	do	5.34	564
	13	do	5.58	682		27	A. W. Harrington	5.51	576

[a] Stage discharge relation affected by ice.

NOTE.—H. L. Stoner and Karl Gilgen are employees of Utah Power & Light Co. Measurements made by Gilgen prior to April, 1916, not used in preparing the rating curve, as later measurements indicate that the results obtained by Gilgen were too large.

Daily discharge, in second-feet, of Bear River at Alexander, Idaho, for the year ending Sept. 30, 1915.

Day.	Oct.	Nov.	Dec.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.
1	985	800	770		860	741	741	626	891	770	729
2	985	800	800		891	718	689	729	891	741	724
3	985	800	800		860	741	677	683	922	741	800
4	985	800	860		891	830	677	581	860	741	830
5	985	800	800		891	860	660	543	830	729	800
6	1,020	800	830		891	860	649	632	860	724	729
7	1,050	800	741		891	860	695	706	891	724	700
8	1,020	800	800		860	830	706	741	891	712	609
9	1,050	800	770		830	770	770	666	860	712	609
10	1,080	800			860	735	800	570	891	706	615
11	1,080	800			860	712	718	521	891	695	668
12	1,050	800			860	677	666	559	922	695	666
13	1,050	800		860	860	649	495	672	891	683	609
14	1,050	800		860	830	712	430	689	922	683	587
15	1,050	770		860	891	891	430	615	860	677	587
16	1,050	729		891	954	891	430	559	891	672	570
17	1,050	770		891	922	830	438	581	954	683	506
18	985	800		860	954	800	446	609	954	683	449
19	891	770		860	922	922	454	615	922	706	435
20	860	741		860	891	954	462	604	922	724	425
21	860	800		891	922	1,020	470	587	922	718	415
22	830	860		891	922	1,120	478	683	954	724	415
23	830	860		891	985	1,120	486	891	891	706	449
24	830	830		860	1,020	1,150	495	830	891	706	480
25	830	830		891	1,080	1,050	538	770	891	712	495
26	830	830		891	954	800	581	741	891	695	576
27	830	830		891	830	741	587	770	891	683	581
28	800	830		860	800	712	554	800	860	683	500
29	800	830			860	689	532	830	830	695	435
30	800	800			830	729	516	860	800	735	485
31	800				770		500		770	741	

NOTE.—Gage not working May 17-23; discharge interpolated. Discharge estimated because of ice from discharge measurements, recorder graph, and climatic data as follows: Dec. 10-31, 900 second-feet; Jan. 1-31, 850 second-feet; Feb. 1-12, 830 second-feet.

Monthly discharge of Bear River at Alexander, Idaho, for the year ending Sept. 30, 1915.

Month.	Discharge in second-feet.			Run-off (total in acre-feet).	Accuracy.
	Maximum.	Minimum.	Mean.		
October	1,080	800	945	58,100	B.
November	860	729	803	47,800	B.
December	....	....	[a]870	53,500	D.
January	....	....	[a]850	52,300	D.
February	....	....	[a]856	47,500	C.
March	1,080	770	892	54,800	B.
April	1,150	649	837	49,800	B.
May	800	430	573	35,200	B.
June	891	521	675	40,200	B.
July	954	770	887	54,500	B.
August	770	672	710	43,700	B.
September	830	415	583	34,700	B.
The year	....	415	790	572,000	

[a] See footnote to table of daily discharge.

BEAR RIVER NEAR PRESTON, IDAHO.

Location.—In sec. 9, T. 15 S., R. 39 E., at Seamon's ranch at Battle Creek highway bridge, about half a mile above mouth of Battle Creek and 4½ miles northwest of Preston, Franklin County.

Drainage area.—4,500 square miles.

Records available.—October 11, 1889, to September 30, 1915.

Gage.—Vertical staff attached to old bridge pile near right bank, installed July 22, 1915; read by O. M. Seamons. Inclined staff, with vertical low-water section, on left bank 50 feet below bridge used December, 1904, to July 21, 1915, with the exception of April 3, 1909, to July 6, 1914, when an inclined staff 500 feet below bridge on right bank was used. Gages used prior to December, 1904, were of vertical staff or wire gage type and attached to old Battle Creek bridge. Exact relation of datum of present gage to that of previous gages not known, but is about 0.5 foot higher than that of gage installed December, 1904.

Discharge measurements.—Made from cable about 200 feet below bridge.

Channel and control.—Bed composed of sand, clay, and gravel; control fairly permanent except during flood stages. One channel at all stages.

Extremes of discharge.—Maximum stage recorded during year, 4.1 feet at 8 a. m. January 25 (discharge not known because of backwater caused by ice jam below gage); minimum stage, 0.1 foot on new gage, about 0.6 foot on gage installed December, 1904, at 6 p. m. August 8 (discharge 235 second-feet).

1889–1915, maximum stage recorded, 5.7 feet June 12, 1907 (discharge, 6,550 second-feet); approximate maximum stage estimated from record at Collinston, Utah, 6.7 feet, June, 1907 (discharge 8,500 second-feet); minimum stage, 0.5 foot August 1–4 and 6–20, 1905 (discharge, 158 second-feet). See paragraph on Gage for changes in gage datum.

Winter flow.—Stage-discharge relation seriously affected at times by backwater from ice.

Diversions.—Numerous ditches divert water for irrigation above station. Last Chance canal, which diverts about 4 miles below Alexander station, carried 270 second-feet May 25, 1911 (measurement by engineer of Telluride Power Co.). West Cache canal, which heads several miles above station, carried 26 second-feet July 24, 1911, and 5 second-feet August 5, 1911. Water diverted by Telluride Power Co. about 6 miles below the Alexander station is used for power development and returned to the river above this station.

REGULATION.—Flow is partly regulated by release of water from Mud or North lake, about 150 miles above station, and by operation of power plants above station.

ACCURACY.—Gage read twice daily to quarter-tenths. Stage-discharge relation practically permanent during 1915 except December 16 to January 5 and January 22–27, when it was affected by backwater from ice. Daily discharge determined by applying mean daily gage heights to the rating table except for the ice periods, for which it was ascertained from observer's notes and records of precipitation and temperature. Records poor for winter period; fair for remainder of year.

COOPERATION.—Gage-height record and one measurement furnished by Utah-Idaho Sugar Co., one measurement furnished by Utah Power & Light Co.

Records derived from observations at this station show practically the amount of water passing from Idaho into Utah and will be of value in the final adjudication of water rights.

Discharge measurements of Bear River near Preston, Idaho, during the year ending Sept. 30, 1915.

Date.	Made by—	Gage height.	Discharge.	Date.	Made by—	Gage height.	Discharge.
		Feet.	*Sec.-ft.*			*Feet.*	*Sec.-ft.*
May 22	W. E. Phelps [a]	1.17	839	Aug. 6	G. C. Baldwin	0.33	298
July 22	H. L. Stoner [b]	.94	563				

[a] Employee of Utah-Idaho Sugar Co. [b] Employee of Utah Power & Light Co.

Daily discharge, in second-feet, of Bear River near Preston, Idaho, for the year ending Sept. 30, 1915.

Day.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.
1	998	1,090	1,180		1,130	1,130	1,040	1,040	580	752	490	791
2	1,090	1,090	1,790		1,130	1,090	871	1,040	611	645	490	645
3	1,130	1,090	1,270		1,130	1,090	955	998	645	716	414	490
4	1,180	1,040	1,230		1,130	1,130	1,090	912	791	679	328	302
5	1,180	1,040	1,280		1,180	1,090	580	871	716	871	314	349
6	1,180	1,040	1,320	1,230	1,090	1,090	645	871	611	791	296	752
7	1,230	1,040	1,270	1,180	1,130	1,130	912	912	548	871	271	611
8	1,180	1,040	1,230	1,180	998	1,130	1,230	912	548	955	249	611
9	1,270	1,040	1,180	1,180	1,040	1,130	1,180	912	548	716	349	679
10	1,370	1,040	998	1,180	1,130	1,090	830	871	548	716	332	548
11	1,420	1,040	752	1,180	1,130	998	611	912	490	548	346	519
12	1,370	1,040	791	1,180	1,180	912	645	912	464	490	342	548
13	1,420	1,090	871	1,180	1,130	912	679	791	464	490	314	580
14	1,470	1,090	912	1,180	1,130	1,130	830	679	490	580	752	679
15	1,570	1,090	912	1,130	1,090	1,130	955	580	437	548	390	679
16	1,470	1,040		1,130	1,090	1,130	1,090	548	464	519	752	645
17	1,370	1,090		1,130	1,090	1,130	1,090	548	490	519	519	519
18	1,370	1,130		1,130	1,180	1,180	1,040	519	490	519	752	645
19	1,270	830		1,180	1,180	1,090	998	548	437	548	284	580
20	1,230	830		1,180	1,230	1,180	1,090	645	390	548	611	548
21	1,130	912		1,130	1,180	1,130	1,230	716	390	548	548	710
22	830	912			1,180	1,230	1,320	716	390	580	611	871
23	1,090	1,180			1,180	1,270	1,420	716	414	580	679	871
24	1,090	1,230			1,180	1,270	1,320	645	414	679	548	679
25	1,090	1,230			1,130	1,230	1,090	679	464	716	464	580
26	998	1,180			1,130	1,180	1,180	716	437	679	548	548
27	998	1,180			1,180	1,180	1,090	716	437	679	548	290
28	1,090	1,180		2,260	1,130	1,130	998	716	414	645	580	328
29	1,090	1,180		1,470		1,130	955	679	370	611	519	580
30	1,090	1,180		1,090		1,040	1,040	611	414	611	548	519
31	1,090			1,130		1,040		611		519	548	

NOTE.—Stage-discharge relation affected by ice Dec. 16 to Jan. 5 and Jan. 22–27; mean discharge estimated as follows: Dec. 16–31, 900 second-feet; Jan. 1–5, 1,100 second-feet; Jan. 22–24, 940 second-feet; Jan. 25–27, 1,000 second-feet.

Monthly discharge of Bear River near Preston, Idaho, for the year ending Sept. 30, 1915.

Month.	Discharge in second-feet.			Run-off (total in acre-feet).	Accuracy.
	Maximum.	Minimum.	Mean.		
October	1,570	830	1,200	73,800	B.
November	1,230	830	1,070	63,700	B.
December	1,790	....	[a] 1,010	62,100	D.
January	2,260	....	[a] 1,160	71,300	D.
February	1,230	998	1,130	62,800	C.
March	1,270	912	1,120	68,900	C.
April	1,420	580	1,000	59,500	C.
May	1,040	519	759	46,700	C.
June	791	370	497	29,600	B.
July	965	490	641	39,400	B.
August	752	249	475	29,200	B.
September	871	290	590	35,100	B.
The year	2,260	249	888	642,000	

[a] See footnote to table of daily discharge.

BEAR RIVER NEAR COLLINSTON, UTAH.

LOCATION.—In the W. ½ sec. 34, T. 13 N., R. 2 W., about a quarter of a mile below the Wheelon plant of the Utah Power & Light Co., at railroad siding called Wheelon, 4 miles north of Collinston, Boxelder County. Below all large tributaries except Little Malad River, which enters about 20 miles below station.

DRAINAGE AREA.—6,000 square miles.

RECORDS AVAILABLE.—July 1, 1889, to September 30, 1915.

GAGE.—Gurley 8-day water-stage recorder on left bank about 12 feet above cable; used February 26, 1914, to September 30, 1915; Friez recorder used November 8, 1913, to February 25, 1914. Gage installed July 1, 1889, and read to February 9, 1905, was a vertical iron bar driven into bed of stream on right bank directly opposite present gage; gage used February 10, 1905, to November 7, 1913, was an inclined staff on right bank. Datum of gage in well, to which recording gage is referred, is 0.05 foot higher than that of vertical and inclined gages.

DISCHARGE MEASUREMENTS.—Made from cable.

CHANNEL AND CONTROL.—Bed composed of gravel and sand. Left bank high and not subject to overflow; right bank moderately high, but might be overflowed by exceptionally high floods. Control not well defined, but practically permanent.

EXTREMES OF DISCHARGE.—Maximum stage recorded during year, from water-stage recorder, 3.11 feet at 9 a. m. February 11 (discharge, 2,610 second-feet); minimum stage, 0.38 foot at 7.15 a. m. August 10 (discharge, 71 second-feet).

1889–1915: Maximum stage recorded, 7.7 feet June 7–10, 1909 (discharge, 11,600 second-feet); minimum stage, —0.55 foot August 4–12, 1905 (discharge, 10 second-feet).

WINTER FLOW.—Stage-discharge relation not seriously affected by ice. Open water rating curve is applicable except for short periods.

DIVERSIONS.—West side canal and Hammond (East Side) canal divert water by means of a low dam about 2 miles above station and near the upper end of Bear River Canyon. Water can be used from either of these canals to supply the Wheelon power plant and can be siphoned across at the plant from one canal to the other. Water passing the Wheelon penstocks is used for irrigation or can be wasted into the river.

Regulation.—Flow at station regulated to some extent by operation of power plant.

Accuracy.—Records good.

Discharge measurements of Bear River near Collinston, Utah, during the year ending Sept. 30, 1915.

Date.	Made by—	Gage height.	Discharge.	Date.	Made by—	Gage height.	Discharge.
		Feet.	*Sec.-ft.*			*Feet.*	*Sec.-ft.*
Oct. 12	L. C. Monson [a]	2.65	1,900	June 29	Lynn Crandall	0.45	86
Mar. 16	.....do	2.40	1,620	July 22	L. C. Monson [a]	.99	336
May 14	Lynn Crandall	1.93	1,090	Aug. 27	L. W. Jordan	.84	236
28	L. C. Monsen [a]	2.35	1,550				

[a] Employee of Utah Power & Light Co.

Daily discharge, in second-feet, of Bear River near Collinston, Utah, for the year ending Sept. 30, 1915.

Day.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.
1	940	1,480	1,710	....	1,630	1,720	1,590	1,590	1,410	78	216	144
2	1,000	1,490	1,780	....	1,640	1,670	1,550	1,640	1,670	75	176	208
3	1,390	1,500	2,080	....	1,690	1,630	1,540	1,750	1,630	80	180	306
4	1,550	1,520	1,700	....	1,750	1,610	1,630	1,720	1,640	96	200	372
5	1,580	1,560	1,570	....	1,670	1,590	1,760	1,590	1,830	140	188	312
6	1,560	1,560	1,700	....	1,590	1,590	1,410	1,460	1,800	418	140	300
7	1,690	1,540	1,750	....	1,560	1,600	1,370	1,390	1,690	481	92	624
8	1,780	1,510	1,710	....	1,520	1,590	1,790	1,280	1,590	474	82	787
9	1,840	1,510	1,590	....	1,510	1,590	1,920	1,230	1,300	378	73	680
10	1,910	1,720	1,560	....	1,780	1,590	1,880	1,250	1,340	372	71	704
11	1,880	1,540	1,510	....	2,610	1,560	1,700	1,180	1,330	336	78	672
12	1,970	1,490	1,370	....	2,280	1,420	1,400	1,190	1,290	235	78	648
13	1,950	1,540	1,410	....	2,130	1,450	1,320	1,130	1,220	225	82	608
14	1,940	1,540	1,220	....	2,080	1,500	1,350	1,080	1,130	112	75	624
15	2,020	1,550	1,170	....	1,940	1,630	1,460	1,020	1,030	100	80	688
16	2,010	1,540	1,320	....	1,810	1,600	1,510	890	832	108	100	769
17	1,950	1,550	1,320	....	1,710	1,610	1,780	736	704	108	104	769
18	1,840	1,510	1,330	....	1,830	1,610	2,040	728	600	108	128	696
19	1,780	1,510	1,370	1,510	1,840	1,610	1,970	796	460	104	200	656
20	1,740	1,340	1,560	1,390	1,840	1,570	1,960	900	184	104	160	680
21	1,690	1,270	....	1,390	1,840	1,570	2,100	1,330	136	104	90	672
22	1,600	1,400	....	1,550	1,800	1,600	2,180	1,470	128	136	92	672
23	1,390	1,600	....	1,500	1,760	1,670	2,280	1,510	112	176	164	680
24	1,520	1,690	....	1,470	1,710	1,760	2,130	1,500	90	188	192	930
25	1,540	1,710	....	1,480	1,700	1,790	2,060	1,490	85	188	156	940
26	1,520	1,710	1,590	1,470	1,700	1,780	1,910	1,520	85	270	216	900
27	1,540	1,700	....	1,510	1,710	1,780	1,710	1,550	85	324	240	930
28	1,590	1,700	....	1,590	1,710	1,750	1,500	1,540	80	245	240	640
29	1,340	1,720	....	1,610	....	1,760	1,360	1,510	90	220	235	640
30	1,450	1,720	....	1,590	....	1,800	1,420	1,490	82	330	235	640
31	1,480	....	....	1,600	....	1,750	....	1,450	....	330	200	....

Note.—Discharge determined from well-defined rating curve. Estimated, on account of ice, as follows: Dec. 21-25, 1,570 second-feet; Dec. 27-31, 1,500 second-feet; Jan. 1-18, 1,520 second-feet.

Monthly discharge of Bear River near Collinston, Utah, for the year ending Sept. 30, 1915.

Month.	Discharge in second-feet.			Run-off (total in acre-feet).	Accuracy.
	Maximum.	Minimum.	Mean.		
October	2,020	940	1,640	101,000	A.
November	1,720	1,270	1,560	92,800	A.
December	2,080	....	1,540	94,700	B.
January	1,610	....	1,520	93,500	B.
February	2,610	1,510	1,800	100,000	A.
March	1,800	1,420	1,640	101,000	A.
April	2.280	1,320	1.720	102,000	A.
May	1,750	728	1,320	81,200	A.
June	1,830	80	855	50,900	A.
July	481	75	214	13,200	A.
August	240	71	145	8,920	A.
September	940	144	630	37,500	A.
The year	2,610	71	1,210	877,000	

SODA CREEK NEAR SODA SPRINGS, IDAHO.

Location.—In sec. 24, T. 8 S., R. 41 E., at George Schmidt's ranch, one-eighth mile below confluence of two branches of creek, about 5 miles north of Soda Springs, Bannock County.

Drainage area.—Not measured.

Records available.—March 5, 1913, to September 30, 1915.

Gage.—Vertical staff on left bank, about one-fourth mile south of ranch house, installed August 1, 1913; read by George Schmidt. Gage used March 5 to July 30, 1913, was 30 feet upstream, but had same control. Datum of old gage between 0.1 and 0.2 feet above that of present gage.

Discharge measurements.—Made by wading.

Channel and control.—Bed composed of lava rock; control is a reef about 15 feet below gage. Stage-discharge relation affected by aquatic growth during summer. During 1915 stage-discharge relation affected by extension of a wing dam at head of small ditch which takes water from right bank at control.

Extremes of discharge.—Maximum stage recorded during year, 4.4 feet at 3 p. m. March 28 (discharge, 108 second-feet); minimum stage, 4.05 feet March 8–13 (minimum discharge of 45 second-feet occurred July 3 and Aug. 16 to Sept. 11).

1913–1915: Maximum stage recorded, 5.3 feet April 6, 1913 (discharge, 324 second-feet); minimum stage, 4.02 feet on several days in January, February, and March, 1914; minimum discharge of 45 second-feet occurred July 3 and August 16 to September 11, 1915.

Winter flow.—Stage-discharge relation not affected by ice.

Diversions.—Practically no water diverted above station; a small ditch takes water just below gage.

Accuracy.—Stage-discharge relation not permanent on account of effect of aquatic growth; not affected by ice. Gage read to quarter-tenths daily. Records good.

Discharge measurements of Soda Creek near Soda Springs, Idaho, during the year ending Sept. 30, 1915.

Date	Made by—	Gage height.	Discharge.	Date.	Made by—	Gage height.	Discharge.
		Feet.	*Sec.-ft*			*Feet.*	*Sec.-ft.*
Nov. 6	L. W. Roush	4.21	70	June 6	A. W. Harrington	4.12	57
Jan. 26	do	4.05	60	July 27	G. C. Baldwin	4.13	46
Apr. 27	G. C. Baldwin	4.11	59	Sept. 27	A. W. Harrington	4.14	48.5

Daily discharge, in second-feet, of Soda Creek near Soda Springs, Idaho, for th year ending Sept. 30, 1915.

Day.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.
1	82	73	63	60	58	58	74	59	63	46	48	4
2	85	73	63	60	58	58	74	61	59	46	48	4
3	85	73	63	60	58	58	71	66	59	45	48	4
4	85	73	63	60	58	58	77	61	59	47	48	4
5	88	70	63	60	58	58	74	61	56	47	48	4
6	94	70	63	60	58	58	74	61	58	47	48	4
7	94	70	63	60	58	58	71	61	56	46	48	4
8	88	70	63	60	58	54	71	59	54	46	48	4
9	88	70	63	60	58	54	71	59	54	48	48	4
10	85	70	60	60	58	54	67	59	54	52	48	4
11	88	70	60	60	58	54	63	58	54	50	48	4
12	88	70	60	60	58	54	60	58	53	50	48	4
13	85	70	60	60	58	54	60	58	53	47	48	4
14	82	71	60	60	58	58	60	58	53	47	48	4
15	82	71	60	60	58	58	60	58	53	46	48	4
16	77	68	60	60	58	58	60	58	53	46	45	4
17	77	68	60	58	58	58	60	58	52	46	45	4
18	73	69	60	58	58	58	60	60	52	46	45	4
19	73	69	60	58	58	58	60	64	52	46	45	4
20	73	69	60	58	58	58	63	64	52	48	45	4
21	73	69	60	58	58	58	63	64	50	48	45	4
22	73	69	58	58	58	60	67	64	50	48	45	4
23	73	66	58	58	58	67	67	67	50	48	45	4
24	73	66	58	58	58	71	67	67	50	48	45	4
25	73	66	58	58	58	77	63	67	49	48	45	4
26	73	66	58	58	58	87	60	67	49	48	45	4
27	73	63	58	58	58	90	60	67	47	48	45	4
28	73	63	58	58	58	108	59	63	47	48	45	4
29	73	63	58	58	....	104	59	63	46	48	45	4
30	73	63	58	58	....	90	59	63	46	48	45	4
31	73	....	58	58	....	82	....	63	....	48	45	......

NOTE.—Discharge ascertained by applying gage heights to several rating tables and by indirect metho or shifting control.

Monthly discharge of Soda Creek near Soda Springs, Idaho, for the year endin Sept. 30, 1915.

Month.	Discharge in second-feet.			Run-off (total in acre-feet).	Accu racy
	Maximum.	Minimum.	Mean.		
October	94	73	79.8	4,910	A.
November	73	63	68.7	4,090	A.
December	63	58	60.2	3,700	B.
January	60	58	59.0	3,630	B.
February	58	58	58.0	3,220	B.
March	108	54	65.5	4,030	A.
April	77	59	65.1	3,870	A.
May	67	58	61.8	3,800	A.
June	63	46	52.8	3,140	B.
July	52	45	47.4	2,910	B.
August	48	45	46.7	2,870	A.
September	49	45	46.4	2,760	A.
The year	108	45	59.3	42,900	

LOGAN RIVER ABOVE STATE DAM, NEAR LOGAN, UTAH.

LOCATION.—In sec. 36, T. 12 N., R. 1 E., at the Logan plant of the Utah Powe & Light Co., 125 feet above the confluence of the tailrace with the rive and 2½ miles above Logan, Cache County.

DRAINAGE AREA.—218 square miles (practically the same as at old station o Logan River near Logan, Utah).

Records available.—May 7, 1913, to September 30, 1915; at old station a quarter of a mile downstream, June 1, 1896, to July 17, 1903, and April 14, 1904, to December 31, 1912; flow at station plus that of tailrace comparable to that at old station.

Gage.—Stevens continuous water-stage recorder on right bank about 100 feet west of power house.

Discharge measurements.—Made by wading at gage; high-water measurements must be made from footbridge at the switchrack about 1,200 feet below, and flow in the tailrace deducted.

Channel and control.—Banks fairly high, clean, and probably not subject to overflow; right bank is a dry rubble retaining wall. Control is a concrete cut-off wall about 6 feet below gage. Stage of zero flow, 0.45 foot.

Extremes of discharge.—Maximum stage recorded during year, 2.82 feet at 9.45 p. m. June 2 (discharge, 375 second-feet): minimum stage, 0.80 foot December 7 (discharge, 13 second-feet).

1913–1915: Maximum stage, probably about 4.4 feet June 4, 1914 (recording gage not working properly; discharge estimated 1,200 second-feet); minimum stage, 0.36 foot September 18, 1913 (discharge, 16 second-feet); minimum discharge, 11 second-feet September 28, 1913 (stage 0.77 foot). Artificial control installed September 24–26, 1913, and stage-discharge relation thereby changed.

Winter flow.—Stage-discharge relation not affected by ice, but recording gage is occasionally out of commission.

Diversions.—The Utah Power & Light Co. diverts water above station for power, and the Logan, Hyde Park, and Smithfield canal diverts for irrigation. The city of Logan has a municipial power plant about 2 miles above station, but water is returned to river above the two diversions noted.

Regulation.—Some diurnal fluctuation is caused at times by the operation of the two power plants.

Accuracy.—Rating curve well defined above 25 second-feet. Conditions for measuring poor at lower stages, but as control is of concrete and stage of zero flow is definitely fixed the rating curve is reasonably well defined at the lower end.

Discharge measurements of Logan River above State dam, near Logan, Utah, during the year ending Sept. 30, 1915.

Date.	Made by—	Gage height.	Discharge.	Date.	Made by—	Gage height.	Discharge.
		Feet.	*Sec.-ft.*			*Feet.*	*Sec.-ft.*
Nov. 11	J. J. Sanford	0.85	18.4	July 15	Lynn Crandall	1.43	66
Jan. 28	L. W. Jordan	1.59	90	Aug. 5	.....do	1.23	44.9
Apr. 3	J. J. Sanford	1.78	125	26	.....do	1.08	32.0
May 13	Lynn Crandall	1.96	140	Sept. 8	L. W. Jordan	.96	20.1

Daily discharge, in second-feet, of Logan River above State dam, near Loga Utah, for the year ending Sept. 30, 1915.

Day.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept
1	29	26	22	92	86	86	117	248	301	95	42	
2	32	24	22	94	88	88	112	269	365	90	47	
3	37	22	22	96	88	85	127	266	346	88	45	
4	34	22	25	100	86	81	140	279	271	82	43	
5	35	21	22	96	86	78	138	261	318	76	44	
6	39	20	16	94	75	89	136	224	321	78	46	
7	36	25	13	95	86	83	140	210	309	81	45	
8	36	25	19	94	76	85	152	197	312	78	43	
9	41	21	18	96	83	85	144	186	324	79	40	
10	66	20	20	96	100	86	144	200	339	75	33	
11	47	19	23	94	94	89	150	193	303	70	33	
12	41	21	25	98	92	88	160	190	263	70	37	
13	39	20	27	98	94	90	177	177	284	70	36	
14	37	19	25	96	92	92	190	224	245	66	36	
15	37	17	30	100	90	89	214	200	214	63	35	
16	37	20	17	86	92	92	235	190	190	61	35	
17	35	19	25	89	94	92	263	193	193	56	34	
18	37	19	32	88	92	92	279	186	177	60	45	
19	37	24	21	92	90	90	298	204	142	58	36	
20	35	20	25	89	90	90	321	243	124	56	35	
21	34	20	22	89	89	90	355	248	107	55	34	
22	34	21	26	53	90	89	352	253	131	54	32	
23	34	21	27	57	89	98	324	243	114	52	33	
24	31	19	27	71	90	107	303	261	109	51	32	
25	30	20	48	74	90	110	287	274	131	49	32	
26	30	18	27	76	92	109	266	284	120	48	32	
27	30	18	30	89	86	112	271	284	112	50	30	
28	29	20	27	88	86	112	258	248	104	48	26	
29	30	25	28	86	....	127	263	248	102	45	25	
30	27	22	27	90	....	120	287	248	100	42	26	
31	27	....	45	88	....	117	....	269	....	41	25	....

NOTE.—Discharge determined from well-defined rating curve. Discharge Nov. 1 and 2 interpolated, recording gage was out of commission. Discharge Nov. 19, Dec. 31, Jan. 22, and Sept. 12 determined mean of hourly discharge on account of variations in stage during the day.

Monthly discharge of Logan River above State dam, near Logan, Utah, for the year ending Sept. 30, 1915.

Month.	Discharge in second-feet.			Run-off (total in acre-feet).	Accuracy.
	Maximum.	Minimum.	Mean.		
October	66	27	35.6	2,190	B.
November	26	18	20.9	1,240	B.
December	48	13	25.3	1,560	B.
January	100	53	88.5	5,440	B.
February	100	75	88.8	4,930	B.
March	127	78	94.9	5,840	A.
April	355	112	220	13,100	B.
May	284	177	232	14,300	B.
June	365	100	216	12,900	B.
July	95	41	64.1	3,940	A.
August	47	25	36.0	2,210	A.
September	36	24	27	1,610	B.
The year	365	13	95.6	69,300	

LOGAN RIVER BELOW STATE DAM, NEAR LOGAN, UTAH.

LOCATION.—In sec. 36, T. 12 N., R. 1 E., about 250 feet below State dam and 2 miles above Logan, Cache County.

DRAINAGE AREA.—Not measured.

RECORDS AVAILABLE.—April 29, 1913, to October 31, 1914, when station was discontinued. November, 1914, to July, 1915, discharge measurements. On July 26, 1915, a new station was established a few hundred feet below head of Logan Northern canal; flow at new station plus that of the Logan Northern canal approximately the same as at this station.

GAGE.—Stevens water-stage recorder on the left bank, 100 feet above the heading of the Logan Northern canal, 100 feet below the confluence of the State tailrace with the main river.

DISCHARGE MEASUREMENTS.—Made from cable at gage or by wading.

CHANNEL AND CONTROL.—Bed composed of gravel and boulders. Banks high, not subject to overflow. One channel at all stages. Concrete cut-off wall, constructed September 28, 1913, acts as control for low stages. Stage of zero flow, about 2.8 feet.

WINTER FLOW.—Stage-discharge relation not affected by ice.

DIVERSIONS.—Water diverted by Logan, Hyde Park, and Smithfield canal, about 2 miles above station, is used for irrigation and is not returned to the river.

REGULATION.—Operation of three power plants above station causes diurnal fluctuations, especially during low-water periods.

ACCURACY.—Records fair.

Discharge measurements of Logan River below State dam, near Logan, Utah, during the year ending Sept. 30, 1915.

Date.	Made by—	Gage height.	Discharge.	Date.	Made by—	Gage height.	Discharge.
		Feet.	*Sec.-ft.*			*Feet.*	*Sec.-ft.*
Nov. 11	J. J. Sanford	3.68	125	May 13	Lynn Crandall	3.58	194
Jan. 28	L. W. Jordan	3.63	115	July 1	E. A. Porter		172
Apr. 3	J. J. Sanford	3.65	117				

NOTE.—Control blasted out and channel completely changed after Apr. 11. On July 1 measured in two channels—river and tailrace.

Daily discharge, in second-feet, of Logan River below State dam, near Logan, Utah, for October, 1914.

Day.	Oct.	Day.	Oct.	Day.	Oct.
1	133	11	159	21	149
2	135	12	156	22	147
3	142	13	156	23	147
4	140	14	156	24	147
5	138	15	156	25	144
6	142	16	154	26	144
7	144	17	152	27	147
8	142	18	152	28	147
9	152	19	149	29	144
10	159	20	149	30	144
				31	142

NOTE.—Discharge determined from fairly well-defined rating curve.

LOGAN RIVER BELOW LOGAN NORTHERN CANAL, NEAR LOGAN, UTAH.

LOCATION.—In the NW. ¼ sec. 36, T. 12 N., R. 1 E., about 500 feet below heading of Logan Northern canal, 850 feet below State dam, and 2 miles above Logan, Cache County.

DRAINAGE AREA.—Not measured.

Records available.—July 26 to September 30, 1915.

Gage.—Stevens water-stage recorder on left bank about 200 feet southwest of the bridge by which State road crosses Logan Northern canal.

Discharge measurements.—Made by wading or from cable 125 feet below gage.

Extremes of discharge.—Maximum stage recorded, 4.64 feet at 7.30 a. m. September 25 (discharge, 108 second-feet); minimum stage, 4.05 feet at 1 p. m. September 2 (discharge, 39 second-feet).

Diversions.—Logan, Hyde Park, and Smithfield canal and Logan Northern canal divert water above station for irrigation.

Regulation.—Operation of power plants above causes some diurnal fluctuation at times during low-water periods.

Accuracy.—Records good.

Discharge measurements of Logan River below Logan Northern canal near Logan, Utah, during the year ending Sept. 30, 1915.

Date.	Made by—	Gage height.	Discharge.	Date.	Made by—	Gage height.	Discharge.
		Feet.	*Sec.-ft.*			*Feet.*	*Sec.-ft.*
Aug. 2	Eugene Schaub [a]	4.50	89	Aug. 25	R. B. West [b]	4.35	71
4	R. B. West [b]	4.56	82	26	Lynn Crandall	4.36	72
4	Eugene Schaub [a]	4.46	81	29	R. B. West [b]	4.31	70
5	Lynn Crandall	4.43	78	Sept. 8	L. W. Jordan	4.42	77

[a] Civil and hydraulic engineer, Logan, Utah.
[b] Professor of irrigation engineering at Utah Agricultural College.

Daily discharge, in second-feet, of Logan River below Logan Northern canal for the year ending Sept. 30, 1915.

Day.	July.	Aug.	Sept.	Day.	July.	Aug.	Sept.	Day.	July.	Aug.	Sept.
1		85	65	11		72	80	21		72	99
2		90	70	12		70	80	22		71	97
3		88	88	13		71	80	23		70	97
4		82	79	14		74	80	24		70	97
5		80	77	15		74	77	25		72	99
6		79	81	16		75	80	26	85	69	105
7		82	80	17		75	77	27	85	66	90
8		76	79	18		75	77	28	84	65	79
9		75	77	19		75	76	29	82	65	76
10		75	77	20		74	81	30	84	65	76
								31	84	65	

Note.—Discharge determined from rating curve well defined for range of stage. Recording gage stopped Sept. 30; discharge estimated.

Monthly discharge of Logan River below Logan Northern canal near Logan, Utah, for the year ending Sept. 30, 1915.

Month.	Discharge in second-feet.			Run-off (total in acre-feet).	Accuracy.
	Maximum.	Minimum.	Mean.		
July 26-31	85	82	84.0	1,000	A.
August	90	65	74.1	4,560	A.
September	105	65	82.5	4.910	A.
The period				10,500	

UTAH POWER & LIGHT CO.'S TAILRACE NEAR LOGAN, UTAH.

Location.—In the NE. ¼ sec. 36, T. 12 N., R. 1 E., 100 feet below power house at plant of Utah Power & Light Co., about 2½ miles above Logan, Cache County.

Records available.—May 7, 1913, to September 30, 1915.

Gage.—Friez water-stage recorder on right bank just above weir.

Discharge measurements.—Made from a footbridge just above gage.

Channel and control.—A rectangular wooden weir, with a metal crest strip just below gage acts as control. Capacity of channel above gage not sufficient to eliminate all velocity of approach. Stage of zero flow, zero on gage.

Extremes of discharge.—Maximum stage recorded during year, 1.75 feet at 6 p. m. November 3 (discharge, 158 second-feet); no flow October 10, February 10, March 9, and August 18.

1913–1915: Maximum stage recorded, 1.77 feet on May 8, 1914 (discharge 162 second-feet); minimum discharge, zero on April 3, 20, August 17, 1914, October 10, February 10, March 9, and August 18, 1915.

Winter flow.—Stage-discharge relation not affected by ice.

Regulation.—Flow at station affected by operation of power plant.

Accuracy.—Records fair.

Canal diverts water from right bank of Logan River in sec. 30, T. 13 N., R 2 E. Water is returned to river 150 feet below gaging station at plant of Utah Power & Light Co. in the N. ½ sec. 36, T. 12 N., R. 1 E. Water is used for power development.

Discharge measurements of Utah Power & Light Co.'s tailrace near Logan, Utah, during the year ending Sept. 30, 1915.

Date.	Made by—	Gage height.	Discharge.	Date.	Made by—	Gage height.	Discharge.
		Feet.	*Sec.-ft.*			*Feet.*	*Sec.-ft.*
Nov. 11	J. J. Sanford	1.46	127	July 26	L. C. Monson [b]	1.23	90
Jan. 26	L. W. Jordan	.46	18.1	Aug. 5	Lynn Crandall	1.23	87
Apr. 2	J. J. Sanford	.38	13.9	26	do	1.22	84
May 1	Porter and West	1.28	95	Sept. 8	L. W. Jordan	1.26	86
15[a]	Lynn Crandall	1.23	83				

[a] Measurement made 150 feet below regular section.

[b] Employee of Utah Power & Light Co.

Daily discharge, in second-feet, of Utah Power & Light Co.'s tailrace near Logan, Utah, for the year ending Sept. 30, 1915.

Day.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.
1	122	132	119	18	20	17	16	14	49	91	89	88
2	136	132	114	20	20	17	16	14	14	94	88	87
3	136	135	120	19	19	17	14	14	16	95	88	87
4	139	135	118	20	19	19	14	15	58	94	88	87
5	135	132	120	19	18	21	14	15	14	94	88	87
6	126	134	114	20	22	20	15	16	14	94	86	87
7	136	134	116	21	18	16	15	16	15	94	85	87
8	136	134	118	20	31	17	16	8.2	14	94	86	87
9	136	136	112	19	22	12	15	11	21	92	90	87
10	106	135	108	17	15	15	14	14	14	92	97	87
11	129	130	116	18	15	15	14	14	51	92	97	87
12	132	132	106	17	16	14	15	14	60	88	90	86
13	132	134	95	17	16	14	15	44	13	85	88	88
14	131	135	88	17	14	14	16	43	56	88	88	88
15	132	131	90	17	16	16	16	29	68	89	88	89
16	132	127	91	16	17	16	15	35	86	96	89	89
17	132	130	94	16	17	16	15	49	91	97	89	89
18	132	130	96	16	17	16	14	54	91	90	73	89
19	132	118	92	17	17	16	14	28	92	90	85	90
20	132	125	86	19	17	14	14	12	92	89	85	90
21	132	124	80	20	17	14	14	12	88	88	85	90
22	134	120	82	34	17	14	14	12	81	88	86	90
23	134	122	89	41	17	14	14	10	88	88	86	90
24	134	121	90	20	16	14	14	12	90	86	86	90
25	131	122	60	23	16	14	13	30	88	86	86	85
26	132	124	84	20	15	13	14	30	92	86	86	86
27	132	124	90	20	17	13	14	28	90	88	86	88
28	132	122	91	19	17	14	14	35	89	88	88	89
29	131	108	91	19	....	16	14	48	88	88	88	90
30	132	119	92	19	....	16	14	63	88	89	88	90
31	132	....	93	18	....	16	....	40	....	89	88	....

NOTE.—Discharge determined from two fairly well defined rating curves, one used Oct. 1 to May 14 and the other May 15 to Sept. 27. Discharge Oct. 10, Dec. 31, Jan. 22 and 23, Feb. 6, 8, and 10, May 8, 13–19, and 25–31, June 1, 4, 9, 11, 12, 14, and 15, and Aug. 18 computed as mean of determinations of hourly discharge on account of fluctuations in stage. Discharge Sept. 2–11 and 28–30 obtained by indirect method for shifting control.

Monthly discharge of Utah Power & Light Co.'s tailrace near Logan, Utah, for the year ending Sept. 30, 1915.

Month.	Discharge in second-feet.			Run-off (total in acre-feet).	Accuracy.
	Maximum.	Minimum.	Mean.		
October	139	106	132	8,120	A.
November	138	108	128	7,620	A.
December	120	60	97.6	6,000	A.
January	41	16	19.9	1,220	B.
February	31	14	17.8	989	B.
March	21	12	15.5	953	B.
April	16	13	14.5	863	B.
May	63	8.2	25.1	1,540	B.
June	92	13	60.4	3,590	A.
July	97	85	90.4	5,560	A.
August	97	73	87.4	5,370	A.
September	90	85	88.1	5,240	A.
The year	139	8.2	65.0	47,100	

LOGAN, HYDE PARK, AND SMITHFIELD CANAL NEAR LOGAN, UTAH.

Location.—In the NE. ¼ sec. 31, T. 12 N., R. 2 E., at concrete rating flume about half a mile below head of canal, 1 mile below city power plant, 1 mile above plant of Utah Power & Light Co., and 3¼ miles from Logan, Cache County.

Records available.—Fragmentary records 1904–1912. Fairly continuous records April 22, 1912, to September 30, 1915.

Gage.—Stevens continuous water-stage recorder on right bank near lower end of rating flume; installed June 6, 1913. Records April 22, 1912, to March 31, 1913, obtained from vertical staff gage at point about 1¼ miles below present gage; two wasteways between the two points. Prior to April 22, 1912, gages were maintained at various points.

Discharge measurements.—Made by wading or from a foot plank at the flume.

Channel and control.—Rectangular concrete rating flume. Stage of zero flow, after control board was installed in April, 1915. 0.35 foot.

Extremes of discharge.—Maximum stage recorded during year, 2.36 feet at 11 a. m. May 6 (discharge, 107 second-feet); minimum stage recorded, 0.23 foot at 10 a. m. April 17 (discharge, 4 second-feet).

1912–1915: Maximum stage recorded, 2.46 feet July 24, 1914 (discharge, 114 second-feet); minimum discharge probably zero (while canal is being cleaned).

Winter flow.—Recording gage usually removed during winter. A small flow of water is maintained for domestic use.

Diversions.—None above the gage.

Regulation.—Flow regulated by headgates at diversion works.

Accuracy.—Records good.

Logan, Hyde Park, and Smithfield canal diverts water from Logan River near corner of secs. 29, 30, 31, and 32, T. 12 N., R. 2 E., for irrigation and domestic use in the territory north of Logan. The water is not returned to the stream.

Discharge measurements of Logan, Hyde Park, and Smithfield canal near Logan, Utah, during the year ending Sept. 30, 1915.

Date.	Made by—	Gage height.	Discharge.	Date.	Made by—	Gage height.	Discharge.
		Feet.	*Sec.-ft.*			*Feet.*	*Sec.-ft.*
Nov. 11	J. J. Sanford	0.70	16.4	July 15	Lynn Crandall	1.46	49.9
Jan. 28	L. W. Jordan	.84	22.0	Aug. 5	.....do	1.18	33.9
May 13	Lynn Crandall	1.85	73	26	.....do	1.11	32.9
July 1	Porter and West	1.61	66	Sept. 8	L. W. Jordan	1.04	28.0

Daily discharge, in second-feet, of Logan, Hyde Park, and Smithfield canal near Logan, Utah, for the year ending Sept. 30, 1915.

Day.	Oct.	Nov.	Apr.	May.	June.	July.	Aug.	Sept.
1	28	19	....	87	82	60	42	30
2	28	19	....	63	82	60	35	30
3	28	19	6	43	81	58	35	32
4	28	19	6	22	79	58	35	30
5	28	16	5	35	79	58	35	30
6	28	17	5	54	79	55	35	28
7	28	17	5	55	78	51	36	28
8	28	17	5	63	78	51	37	27
9	18	16	5	69	79	51	38	26
10	13	16	5	64	80	52	37	26
11	13	16	5	73	79	51	37	28
12	16	....	5	73	79	51	37	28
13	19	....	5	86	78	51	36	28
14	19	....	5	100	78	51	33	26
15	19	....	5	98	76	51	32	26
16	19	....	4	96	76	46	33	24
17	19	....	5	98	77	44	32	24
18	19	....	5	99	78	43	33	23
19	19	....	5	97	76	43	32	22
20	19	....	5	84	95	43	32	22
21	19	....	5	78	104	43	32	22
22	19	....	5	77	90	43	32	22
23	19	....	4	76	91	42	32	22
24	19	....	22	76	78	42	32	21
25	18	....	34	78	63	42	31	22
26	19	....	46	38	62	42	30	37
27	19	....	64	31	61	42	30	36
28	19	....	92	78	61	42	30	28
29	19	....	99	78	61	42	30	27
30	19	....	88	79	60	45	30	26
31	19	....	....	79	....	46	30	....

NOTE.—Discharge determined from two fairly well defined rating curves, one applicable Oct. 1 to Apr. 21 and the other Apr. 23 to Sept. 30. Recording gage out Nov. 12 to Apr. 2 and no records were kept; probably some water running in the canal all winter for domestic use. Discharge Apr. 22, the day on which control board was probably installed, determined by using the first rating table part of the day and the second for the remainder. Discharge Apr. 24, 26, 27, and 30, May 2, 4, 5, 10, 13, 20, 26, and 27, and June 20, 22, and 24 determined as the mean of determinations of hourly discharge on account of fluctuations in head.

Monthly discharge of Logan, Hyde Park, and Smithfield canal near Logan, Utah, for the year ending Sept. 30, 1915.

Month.	Discharge in second-feet.			Run-off (total in acre-feet).	Accuracy.
	Maximum.	Minimum.	Mean.		
October	28	13	20.8	1,280	B.
November 1-11	19	16	17.4	380	B.
April 3-30	99	4	19.6	1,090	B.
May	100	22	71.8	4,410	A.
June	104	60	77.3	4,600	A.
July	60	42	48.4	2,980	B.
August	42	30	33.6	2,070	B.
September	37	21	26.7	1,590	B.

LOGAN NORTHERN CANAL NEAR LOGAN, UTAH.

LOCATION.—In sec. 36, T. 12 N., R. 1 E., at upper end of the timber-lined section, about 800 feet below head of canal, and 2 miles above Logan, Cache County.

RECORDS AVAILABLE.—June 6, 1913, to September 30, 1914; May 13 to December 31, 1915.

GAGE.—Stevens continuous water-stage recorder on right bank immediately above lined section of canal.

DISCHARGE MEASUREMENTS.—Made by wading or from foot plank.

CHANNEL AND CONTROL.—Bed at the gage is composed of earth and gravel; immediately below is a timber-lined rectangular section which contracts the width very slightly. A low control board has been installed at the upper end of this section, making stage of zero flow 0.45 foot.

EXTREMES OF DISCHARGE.—Maximum stage recorded during year, 2.51 feet at 10 a. m. June 22 (discharge, 99 second-feet) (canal dry part of year).

1913–1915: Maximum stage recorded, 2.58 feet July 15, 1913 (discharge, 103 second-feet). (Canal dry most of nonirrigation seasons.)

WINTER FLOW.—No record kept during winter; canal usually dry.

DIVERSIONS.—Above all diversions.

REGULATION.—Flow regulated by head gates at point of diversion.

ACCURACY.—Records only fair.

The Logan Northern canal heads in the right bank of Logan River in the SW. ¼ NW. ¼ sec. 36, about 350 feet below the State dam. The water is used primarily for irrigation and is not returned directly to the stream.

Discharge measurements of Logan Northern canal near Logan, Utah, during the year ending Sept. 30, 1915.

Date.	Made by—	Gage height.	Discharge.	Date.	Made by—	Gage height.	Discharge.
		Feet.	*Sec.-ft.*			*Feet.*	*Sec.-ft.*
May 13	Lynn Crandall	1.39	45.2	Aug. 5	Lynn Crandall	1.40	38.8
July 1	Porter and West	1.95	70	26	do	1.25	31.5
15	Lynn Crandall	1.66	52	Sept. 8	L. W. Jordan	1.01	22.2

Daily discharge, in second-feet, of Logan Northern canal near Logan, Utah, for 1915.

Day	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1		40	70	38	31	22	25	6
2		40	66	35	31	22	25	6
3		15	62	35	31	22	25	6
4		1	60	37	31	22	24	6
5		1	58	39	30	22	24	6
6		1	57	38	23	22	24	6
7		0	54	39	22	22	26	6
8		32	54	39	22	22	30	6
9		50	52	38	23	22	30	6
10		50	54	38	28	22	30	21
11		50	52	37	23	22	26	4
12		50	52	37	23	22	23	4
13	20	49	52	36	23	22	23	3
14	56	49	53	35	22	22	20	3
15	70	49	52	35	22	22	29	3
16	71	49	52	33	22	22	32	8
17	72	51	46	33	22	22	24	3
18	68	61	47	34	22	22	24	3
19	51	79	52	34	21	22	22	2
20	39	88	46	33	15	30	6	2
21	30	90	45	33	0	56	5	1
22	30	96	44	33	0	56	4	.5
23	30	92	43	32	0	56	4	0
24	30	70	44	32	0	56	11	0
25	31	68	44	32	0	56	12	0
26	18	70	43	31	0	41	8	0
27	1	71	44	31	10	22	5	0
28	15	70	44	31	22	22	5	0
29	41	70	44	31	22	22	5	0
30	40	70	41	31	22	18	5	1
31	40		41	31		25		2

NOTE.—Discharge determined from poorly defined rating curves, used as follows: May 13 to July 1, Aug. 26 to Sept. 26, Sept. 27 to Oct. 19, Oct 21 to Dec. 31. Discharge July 2 to Aug. 25 and Oct. 20 determined by indirect method for shifting control; May 12, 26 and 28, June 3 and 8, Sept. 20, 27, Oct. 26, 30, Nov. 15, 16, and 19, and Dec. 10 determined by using the mean of determinations of hourly discharge, on account of sudden changes in flow.

Monthly discharge of Logan Northern canal near Logan, Utah, for 1915.

Month.	Discharge in second-feet.			Run-off (total in acre-feet).	Accuracy.
	Maximum.	Minimum.	Mean.		
May 12-31	72	0	37.6	1,490	C.
June	96	0	52.4	3,120	C.
July	70	41	50.6	3,110	B.
August	39	31	34.5	2,120	B.
September	31	0	18.6	1,110	C.
October	56	18	28.3	1,740	C.
November	32	4	18.5	1,100	C.
December	21	0	3.53	217	D.
The period				14,000	

BLACKSMITH FORK ABOVE UTAH POWER & LIGHT CO.'S DAM, NEAR HYRUM, UTAH.

Location.—In the NE. ¼ sec. 8, T. 10 N., R. 2 E., 1 mile above the diversion dam of Utah Power & Light Co., 3½ miles above power plant, and 6 miles from Hyrum, Cache County.

Drainage area.—260 square miles (measured on topographic maps and map of Cache National Forest).

Records available.—July 19, 1900, to December 31, 1902; November 28, 1913, to September 30, 1915.

Gage.—Stevens continuous water-stage recorder on left bank 500 feet above wagon bridge and nearly a mile above dam installed November 28, 1913. A gage at old toll gate in mouth of canyon 3½ miles downstream was used July 19, 1900, to December 31, 1902. Flow about the same at both points.

Discharge measurements.—Made by wading about three-eighths mile above gage or from a cable a quarter of a mile above gage. Conditions at wading section good; at cable poor, especially at high stages.

Channel and control.—Bed rough but fairly permanent; one channel at all stages.

Extremes of discharge.—Maximum stage recorded during year, 1.71 feet, at 1 p. m. October 1 (discharge, 124 second-feet); minimum stage, 1.1 feet, at 8 a. m. January 23 (discharge, 53 second-feet).

1913–1915; Maximum stage recorded, 3.39 feet, April 21, 1914 (discharge, 669 second-feet); minimum stage, 1.1 feet January 23, 1915 (discharge, 53 second-feet).

Winter flow.—Stage-discharge relation not seriously affected, as current is swift and turbulent. Open-channel rating curve assumed applicable.

Diversions.—Above all important diversions.

Regulation.—None.

Accuracy.—Records fair.

Discharge measurements of Blacksmith Fork above Utah Power & Light Co.'s dam, near Hyrum, Utah, during the year ending Sept. 30, 1915.

Date.	Made by—	Gage height.	Discharge.	Date.	Made by—	Gage height.	Discharge.
		Feet.	*Sec.-ft.*			*Feet.*	*Sec.-ft.*
Nov. 10	J. J. Sanford	1.58	103	May 27	L. C. Monson	1.55	106
Jan. 29	L. W. Jordan	1.45	94	June 30	E. A. Porter	1.46	91
Mar. 15	L. C. Monson[a]	1.45	97	July 26	L. C. Monson	1.40	76
Apr. 2	J. J. Sanford	1.50	88	Aug. 6	Lynn Crandall	1.39	73
May 12	Lynn Crandall	1.54	96	25	do	1.37	71

[a] Employee of Utah Power & Light Co.

Daily discharge, in second-feet, of Blacksmith Fork above Utah Power & Light Co.'s dam, near Hyrum, Utah, for the year ending Sept. 30, 1915.

Day.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.
1	122	96	112	100	94	89	86	100	102	90	75	70
2	120	94	108	98	94	90	86	100	104	90	75	72
3	120	94	112	99	98	92	99	99	102	90	74	83
4	119	94	112	96	94	92	107	99	100	90	72	76
5	120	98	112	96	93	92	100	98	102	87	71	77
6	119	102	112	96	90	92	99	99	105	86	74	74
7	114	102	112	96	96	92	102	99	102	86	72	72
8	117	100	108	96	96	92	114	98	100	83	74	72
9	115	102	107	96	96	92	107	98	100	84	72	71
10	114	102	105	96	99	92	102	99	100	83	72	72
11	114	102	107	96	96	92	102	100	99	83	71	80
12	112	102	107	98	96	92	100	99	104	83	71	81
13	110	102	107	98	93	96	102	96	102	83	71	78
14	110	102	104	96	93	96	104	99	100	83	69	78
15	110	99	104	100	92	98	104	98	99	83	69	77
16	108	99	100	100	94	98	108	94	98	83	70	76
17	107	100	105	108	94	96	114	99	98	82	69	74
18	107	100	108	89	94	94	110	104	98	82	70	74
19	105	102	105	94	94	93	110	102	98	80	71	76
20	105	102	102	96	94	92	108	102	96	80	70	76
21	102	104	90	96	92	90	108	102	94	82	69	74
22	102	104	96	69	92	90	107	107	93	82	68	74
23	104	105	117	69	92	90	107	105	93	80	69	76
24	98	105	104	68	92	93	105	104	93	80	70	76
25	107	107	104	70	92	93	102	107	92	80	71	78
26	107	107	104	104	92	90	100	105	90	76	70	86
27	104	108	104	96	90	90	100	105	90	75	69	81
28	98	108	104	92	89	89	100	100	90	75	70	81
29	99	107	104	96	......	90	100	102	90	74	69	80
30	93	110	104	96	......	87	100	100	92	74	69	80
31	98	......	102	96	......	84	......	99	......	74	70	......

Monthly discharge of Blacksmith Fork above Utah Power & Light Co.'s dam, near Hyrum, Utah, for the year ending Sept. 30, 1915.

Month.	Discharge in second-feet.			Run-off (total in acre-feet).	Accuracy.
	Maximum.	Minimum.	Mean.		
October	122	98	109	6,700	C.
November	110	94	102	6,070	B.
December	117	90	106	6,520	B.
January	108	68	93.4	5,740	B.
February	99	89	93.6	5,200	B.
March	98	84	91.9	5,650	B.
April	114	86	103	6,130	B.
May	107	94	101	6,210	B.
June	105	90	97.5	5,800	B.
July	90	74	82.0	5,040	B.
August	75	68	70.8	4,350	B.
September	86	70	76.5	4,550	B.
The year	122	68	93.9	68,000	

BLACKSMITH FORK AT UTAH POWER & LIGHT CO.'S PLANT NEAR HYRUM, UTAH.

Location.—In sec. 11, T. 10 N., R. 1 E., immediately above wagon bridge, 300 feet above confluence of the Utah Power & Light Co.'s tailrace with main stream, and 2½ miles east of Hyrum, Cache County.

Drainage area.—Not measured.

Records available.—April 15, 1914, to September 30, 1915.

Gage.—Stevens continuous water-stage recorder on right bank.

Discharge measurements.—Made by wading or from cable at gage.

Channel and control.—Bed composed of gravel overgrown with aquatic plants. Concrete cut-off wall installed about 10 feet below gage forms control.

Extremes of discharge.—Maximum stage recorded during year, 4.63 feet at 6 a. m. October 5 (discharge, 117 second-feet); minimum stage, 3.79 feet June 24–27 (discharge, 9 second-feet).

1914–1915: Maximum stage recorded, 6.20 feet April 21, 1914 (discharge, about 500 second-feet); minimum stage, 3.79 feet June 24–27, 1915 (discharge, 9 second-feet).

Winter flow.—Stage-discharge relation not affected by ice, as low-water flow is maintained by springs a short distance above gage.

Diversions.—Water diverted for power development by Utah Power & Light Co. 2½ miles above station, is returned to stream 300 feet below gage. During low-water periods entire flow is diverted, and the records obtained at the gage represent inflow from springs between diversion dam and gage. The Hyrum city power canal diverts water 300 feet below gage at the mouth of tailrace of the Utah Power & Light Co. Station is above all diversions for irrigation.

Regulation.—See diversions.

Accuracy.—Records good.

Discharge measurements of Blacksmith Fork at Utah Power & Light Co.'s plant near Hyrum, Utah, during the year ending Sept. 30, 1195.

Date.	Made by—	Gage height.	Discharge.	Date.	Made by—	Gage height.	Discharge.
		Feet.	*Sec.-ft.*			*Feet.*	*Sec.-ft.*
Nov. 10	J. J. Sanford	3.86	12.5	May 12	Lynn Crandall	3.83	10.6
Jan. 29	L. W. Jordan	3.83	12.8	Aug. 6	.....do	3.82	10.7
Apr. 2	J. J. Sanford	3.84	12.0				

Daily discharge, in second-feet, of Blacksmith Fork at Utah Power & Light Co.'s plant near Hyrum, Utah, for the year ending Sept. 30, 1915.

Day.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.
1	15	23	13	11	9.6	13	11	12	11	9.0	9.6	9.6
2	14	20	13	11	9.6	13	11	12	11	9.0	10	9.6
3	14	17	12	11	9.6	13	12	12	11	9.0	10	9.6
4	79	17	12	11	10	12	17	12	10	9.0	10	10
5	89	17	12	11	10	12	14	12	10	9.0	10	10
6	57	15	12	11	10	12	13	11	10	9.0	10	10
7	58	15	12	11	10	12	14	11	10	9.0	10	10
8	62	17	12	11	11	12	20	11	10	9.0	10	10
9	54	16	11	11	11	12	15	11	10	9.0	10	10
10	53	13	11	11	11	12	13	10	10	9.0	10	10
11	47	14	11	11	11	12	13	11	10	9.0	10	10
12	44	15	11	11	12	12	14	11	10	9.0	10	11
13	33	19	11	11	11	13	14	11	9.6	9.0	10	10
14	30	17	11	11	13	12	13	10	9.6	9.0	10	10
15	28	17	11	11	12	12	13	10	9.6	9.0	10	10
16	27	13	11	11	12	11	15	10	9.0	9.0	10	10
17	26	13	12	11	11	11	17	10	9.0	9.0	10	10
18	23	13	14	11	12	11	15	10	9.6	9.0	10	9.6
19	20	11	16	12	12	11	16	10	9.6	9.0	10	9.6
20	21	12	14	12	12	11	14	10	9.0	9.0	9.6	10
21	21	12	14	12	13	11	14	10	9.0	9.0	9.6	10
22	21	13	11	12	13	11	14	10	9.0	9.0	9.6	9.6
23	21	13	12	12	13	11	14	10	9.0	9.6	9.6	9.6
24	23	13	13	11	13	11	13	11	8.6	9.6	9.6	9.6
25	23	13	13	11	13	11	13	11	8.6	9.6	9.6	10
26	24	13	13	12	13	11	13	11	8.6	9.6	9.6	11
27	25	13	13	11	13	11	13	11	8.6	9.6	9.6	11
28	21	13	12	11	13	11	13	11	8.6	9.6	9.6	11
29	21	13	12	11	......	11	13	11	9.0	9.6	9.6	11
30	23	13	11	9.6	......	11	13	11	9.0	9.6	9.6	11
31	24	......	11	9.6	......	11	......	11	......	9.6	9.6	......

Note.—Discharge determined from a fairly well defined rating curve.

Monthly discharge of Blacksmith Fork at Utah Power & Light Co.'s plant near Hyrum, Utah, for the year ending Sept. 30, 1915.

Month.	Discharge in second-feet.			Run-off (total in acre-feet).	Accuracy.
	Maximum.	Minimum.	Mean.		
October	89	14	33.6	2,070	B.
November	23	11	14.8	881	B.
December	16	11	12.2	750	B.
January	12	9.6	11.1	682	B
February	13	9.6	11.6	644	B.
March	13	11	11.6	713	B.
April	20	11	13.9	827	B.
May	12	10	10.8	664	B.
June	11	8.6	9.53	567	C.
July	9.6	9.0	9.17	564	B.
August	10	9.6	9.83	604	B.
September	11	9.6	10.1	601	B.
The year	89	8.6	13.2	9,570	

BLACKSMITH FORK BELOW UTAH POWER & LIGHT CO.'S PLANT NEAR HYRUM, UTAH.

Location.—In sec. 2, T. 10 N., R. 1 E., six or seven hundred feet below heading of Hyrum city power canal and mouth of Utah Power & Light Co.'s tailrace, and about 2½ miles east of Hyrum, Cache County.

Drainage area.—Not measured.

Records available.—May 16, 1904, to December 31, 1910; April 15, 1914, to September 30, 1915.

Gage.—Stevens's continuous water-stage recorder on right bank; installed April 15, 1915. Gage used 1904–1910 was a vertical staff about 300 feet above present site and at different datum.

Discharge measurements.—Made by wading at various sections or from cable about 100 feet below gage. Conditions for measuring poor and there are springs all along this section of the river.

Channel and control.—Bed composed of gravel and boulders; steep. Banks low and covered with willows, but will probably not be overflowed except during extraordinary floods. Concrete wall about 10 feet below gage acts as control. Stage of zero flow, 4.4 feet.

Extremes of discharge.—Maximum stage recorded during year, 5.40 feet at 4.30 p. m. May 24 (discharge, 84 second-feet); minimum stage, 4.60 feet at 5 p. m. March 13 (discharge, 6 second-feet).

1904–1910, and 1914–15: Maximum stage recorded, 6.8 feet April 16, 1907 (discharge, 1,810 second-feet); minimum stage, 4.60 feet March 13, 1915 (discharge, 6 second-feet). New datum in 1915. See gage.

Winter flow.—Stage-discharge relation not usually affected by ice, on account of springs in the vicinity.

Diversions.—Water diverted above station by Hyrum city power canal is returned to stream about a quarter of a mile downstream. The Utah Power & Light Co. diverts about 2½ miles upstream, but the tailrace of this plant enters just above head of city canal.

Regulation.—Flow at gage affected by operation of the two plants.

Accuracy.—Records poor.

Discharge measurements of Blacksmith Fork below Utah Power & Light Co.'s plant near Hyrum, Utah, during the year ending Sept. 30, 1915.

Date.	Made by—	Gage height.	Discharge.	Date.	Made by—	Gage height.	Discharge.
		Feet.	*Sec.-ft.*			*Feet.*	*Sec.-ft.*
Nov. 10[a]	J. J. Sanford	4.89	21.6	May 12[a]	Lynn Crandall	4.84	12.7
10	do	4.89	22.5	June 30	E. A. Porter	4.76	13.4
Jan. 29[a]	L. W. Jordan	4.73	8.5	Aug. 6[a]	Lynn Crandall	4.74	14.1
29	do	4.73	16.0	Aug. 25[a]	do	4.68	11.5
Apr. 2[a]	J. J. Sanford	4.60	4.9				

[a] Measured above gage. Inflow between this point and cable section.

Daily discharge, in second-feet, of Blacksmith Fork below Utah Power & Light Co.'s plant near Hyrum, Utah, for the year ending Sept. 30, 1915.

Day.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.
1	39	28	21	16	13	11	10	24	22	15	13	10
2	39	24	20	16	13	12	10	24	22	15	14	10
3	39	27	20	15	14	11	11	24	21	16	14	12
4	23	27	20	15	14	12	15	22	21	16	14	10
5	31	25	20	17	14	12	12	21	22	15	13	11
6	29	25	20	15	13	11	13	20	22	15	14	10
7	30	24	19	15	14	11	14	20	22	15	12	10
8	32	24	19	15	12	10	17	20	23	14	13	10
9	30	24	18	14	13	10	18	20	24	14	13	10
10	31	23	17	13	13	10	17	20	23	14	14	10
11	33	21	19	14	13	10	15	20	23	15	12	11
12	33	21	18	14	13	10	16	21	24	14	12	12
13	32	23	17	13	14	10	17	23	24	12	12	11
14	32	20	17	13	12	9	17	18	24	14	12	11
15	31	23	15	12	12	10	19	19	24	17	14	10
16	30	22	13	12	11	10	21	20	23	12	12	16
17	30	26	12	12	11	10	23	20	24	11	12	10
18	31	28	12	12	12	10	26	21	26	13	13	10
19	30	17	12	12	12	10	23	20	26	12	13	10
20	29	17	12	13	11	9	22	20	26	14	13	10
21	29	20	12	19	11	9	22	28	26	14	12	10
22	28	21	14	15	11	9	23	34	25	15	11	10
23	27	21	14	13	11	10	22	34	24	15	11	10
24	27	21	13	17	11	9	23	50	23	15	10	10
25	27	21	14	18	11	10	27	39	15	14	10	10
26	27	21	14	23	11	10	23	22	15	14	10	14
27	27	22	16	18	11	10	23	22	14	14	10	11
28	30	22	16	14	11	10	24	21	14	14	10	10
29	24	21	16	13	......	10	24	21	15	14	10	10
30	25	21	15	14	......	9	24	24	15	14	10	10
31	25	......	17	14	......	10	......	22	......	15	10	......

NOTE.—Discharge determined from a poorly defined rating curve.

Monthly discharge of Blacksmith Fork below Utah Power & Light Co.'s plant near Hyrum, Utah, for the year ending Sept. 30, 1915.

Month.	Discharge in second-feet.			Run-off (total in acre-feet).	Accuracy.
	Maximum.	Minimum.	Mean.		
October	39	23	30.0	1,840	C.
November	28	17	22.7	1,350	C.
December	21	12	16.2	996	C.
January	23	12	14.7	904	C.
February	14	11	12.2	678	D.
March	12	9	10.1	621	D.
April	27	10	19.0	1,130	D.
May	50	18	23.7	1,460	D.
June	26	14	21.7	1,290	D.
July	17	11	14.2	873	C.
August	14	10	12.0	738	C.
September	14	10	10.4	619	C.
The year	50	9	17.3	12,500	

HYRUM CITY POWER CANAL NEAR HYRUM, UTAH.

LOCATION.—In sec. 2, T. 10 N., R. 1 E., about 300 feet below head of canal which diverts immediately below confluence of Utah Power & Light Co.'s tailrace with main stream; about 2½ miles east of Hyrum, Cache County.

RECORDS AVAILABLE.—1904–1910, and April 15, 1914, to September 30, 1915. Records from 1904–1910 were published under head "Blacksmith Fork (or Hyrum) power plant race near Hyrum, Utah."

GAGE.—Stevens continuous water-stage recorder on right bank immediately below footbridge. Gage used 1904–1910 was a vertical staff at approximately same site but different datum.

DISCHARGE MEASUREMENTS.—Made from footbridge or by wading.

CHANNEL AND CONTROL.—Bed composed of earth and gravel. Right bank covered with willows. Control not clearly defined.

EXTREMES OF DISCHARGE.—1904–1910, 1914–15: Maximum stage recorded, 6.5 feet at 6 p. m. April 3, 1915 (discharge, 128 second-feet); minimum stage, 4.48 feet at 7.30 a. m. August 15, 1915 (discharge, 9 second-feet).

WINTER FLOW.—Stage-discharge relation not seriously affected by ice; open-water rating curve used to determine discharge.

DIVERSIONS.—None.

REGULATION.—Flow regulated by gates at head of canal.

ACCURACY.—Records good.

Canal diverts water from left side of Blacksmith Fork in sec. 2, T. 10 N., R. 1 E., immediately below tailrace of Utah Power & Light Co. Water is used for power development at the Hyrum city power plant and is returned to the river.

Discharge measurements of Hyrum city power canal near Hyrum, Utah, during the year ending Sept. 30 1915.

Date.	Made by—	Gage height.	Discharge.	Date.	Made by—	Gage height.	Discharge.
		Feet.	*Sec.-ft.*			*Feet.*	*Sec.-ft.*
Nov. 10	J. J. Sanford	6.19	99	May 12	Lynn Crandall	6.15	92
Jan. 29	L. W. Jordan	6.08	86	Aug. 6	do	5.83	66
Apr. 2	J. J. Sanford	6.07	94	25	do	5.88	70

Daily discharge, in second-feet, of Hyrum city power canal near Hyrum, Utah, for the year ending Sept. 30, 1915.

Day.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.
1	99	101	90	94	80	84	88	104	84	70	65	68
2	99	99	93	93	80	88	88	104	87	68	65	71
3	99	100	94	94	86	88	92	99	84	68	66	83
4	94	99	94	94	88	88	100	97	84	68	64	74
5	98	99	94	99	85	86	97	97	82	67	63	76
6	102	97	90	97	83	86	97	97	84	67	68	71
7	102	95	94	96	84	85	96	95	85	66	66	69
8	102	95	90	96	84	85	107	94	84	68	65	69
9	100	97	90	94	88	85	107	95	95	66	65	69
10	101	98	88	91	84	85	104	94	80	67	65	70
11	100	95	88	92	88	84	102	94	82	68	63	74
12	100	94	88	92	87	85	102	94	83	66	63	75
13	98	95	88	92	91	84	105	104	84	65	62	74
14	98	94	88	91	80	89	105	90	81	66	62	72
15	97	95	88	92	88	87	106	86	97	83	60	71
16	96	94	94	94	84	88	109	90	78	66	63	70
17	97	101	94	94	84	86	111	94	76	63	64	67
18	98	97	94	94	88	88	105	90	73	65	64	68
19	98	87	93	93	84	86	108	90	72	65	66	70
20	97	85	94	92	82	86	107	88	69	65	65	68
21	98	91	90	93	85	84	107	72	70	65	65	67
22	97	91	86	80	84	86	106	74	68	66	63	67
23	97	91	86	70	86	84	105	73	67	66	65	68
24	98	90	86	75	84	88	105	54	68	76	68	68
25	99	90	89	77	85	88	98	70	68	63	71	69
26	99	91	92	88	85	88	105	87	68	64	70	82
27	99	91	92	94	84	89	104	86	69	64	69	74
28	102	92	93	92	83	88	104	86	69	64	69	69
29	97	92	93	90	....	90	104	85	70	64	68	69
30	99	91	94	88	....	88	104	80	70	64	68	68
31	98	....	94	88	....	91	....	85	....	62	68	....

NOTE.—Discharge determined from a rating curve well defined between 50 and 110 second-feet. Recording gage not operating properly Oct. 5, Dec. 11–14, 21, 23, 25, and 31, and July 4; discharge interpolated.

Monthly discharge of Hyrum city power canal near Hyrum, Utah, for the year ending Sept. 30, 1915.

Month.	Discharge in second-feet.			Run-off (total in acre-feet).	Accuracy.
	Maximum.	Minimum.	Mean.		
October	102	94	98.6	6,090	B.
November	101	85	94.2	5,610	B.
December	94	86	91.0	5,600	B.
January	99	70	90.5	5,560	B.
February	91	80	84.8	4,710	B.
March	91	84	86.7	5,330	B.
April	111	88	103	6,130	B.
May	104	54	88.6	5,450	B.
June	97	67	77.7	4,620	B.
July	83	62	66.7	4,100	B.
August	71	60	65.4	4,020	B.
September	83	67	71.0	4,220	B.
The year	111	54	84.8	61,400	

WEST SIDE CANAL NEAR COLLINSTON, UTAH.

LOCATION.—In the NW. ¼ sec. 34, T. 13 N., R. 2 W., at Wheelon siding on the Oregon Short Line Railroad, about 600 feet below the penstock of the Utah Power & Light Co.'s Wheelon plant, 1,000 feet northwest of gaging station on Bear River and 4 miles north of Collinston, Boxelder County.

RECORDS AVAILABLE.—June 1, 1912, to September 30, 1915.

GAGE.—Friez water-stage recorder on left bank installed May 22, 1914, at same site and datum as inclined staff gage used prior to that time.

DISCHARGE MEASUREMENTS.—Made from footbridge at gage or by wading.

CHANNEL AND CONTROL.—Bed composed of earth and gravel; banks steep and clean. Control not well defined, but seems fairly permanent.

Extremes of discharge.—Maximum stage recorded during year, 7.5 feet June 21 (discharge, 516 second-feet); canal dry April 8–25.

1912–1915: Maximum stage recorded, 7.86 feet July 1, 1912 (discharge, 563 second-feet); canal dry February 17–24, April 7–29, 1913, and April 8–25, 1915.

Winter flow.—Stage-discharge relation seriously affected at times by ice; discharge not determined.

Diversions.—Water is taken out of canal, about 600 feet above gage, for the power plant, and, if necessary, water can also be siphoned across the river to the Hammond canal.

Regulation.—Flow can be regulated at the head gates and also at the forebay of the power plant.

Accuracy.—Records good.

Canal diverts water from west side of Bear River in the SW. ¼ sec. 28, T. 13 N., R. 2 W., by means of a low diversion dam. Part of the water is used through the Wheelon plant of the Utah Power & Light Co. about 1½ miles below; the rest is used for irrigation on west side of river. When cleaning or repairing the Hammond canal in the canyon water can be siphoned across the river at the power plant from the West Side canal.

Discharge measurements of West Side canal near Collinston, Utah, during the year ending Sept. 30, 1915.

Date.	Made by—	Gage height.	Discharge.	Date.	Made by—	Gage height.	Discharge.
		Feet.	*Sec.-ft.*			*Feet.*	*Sec.-ft.*
Oct. 12	Utah Power & Light Co.	4.40	154	June 30	Lynn Crandall	6.95	457
Mar. 16	do	1.80	20.5	July 27	Utah Power & Light Co.	7.19	453
May 14	Lynn Crandall	4.01	135	27	L. W. Jordan	6.80	431
28	Utah Power & Light Co.	3.94	128				

Daily discharge, in second-feet, of West Side canal near Collinston, Utah, for the year ending Sept. 30, 1915.

Day.	Oct.	Nov.	Dec.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.
1	168	139	48		21	15	24	105	477	425	451
2	168	135	50		20	14	24	111	477	425	451
3	168	128	50		22	15	24	108	451	425	399
4	183	124	49		20	15	24	111	490	399	361
5	183	117	52		20	14	24	93	490	399	
6	178	98	50		19	14	24	87	503	361	
7	164	103	49		18	4	35	99	464	349	
8	164	98	50		18		41	111	464	335	
9	164	84	49		19		69	136	464	301	
10	168	81	48		18		90	168	451	325	
11	173	84	48		19		90	188	451	361	225
12	164	84	46		20		93	168	451	373	225
13	155	84	45		20		93	225	464	386	220
14	151	81	45		20		125	262	503	386	220
15	155	90			20		172	274	503	425	225
16	155	78			20		176	325	490	477	210
17	147	78			20		176	361	490	477	225
18	147	84			20		164	361	490	490	230
19	147	90			19		164	503	490	477	235
20	151	81			19		164	503	503	464	230
21	151	75		18	19		164	516	503	464	220
22	143	75		19	17		160	516	490	464	220
23	143	78		18	15		160	503	490	464	220
24	143	75		28	15		156	503	490	438	206
25	139	75		19	15		136	490	503	468	197
26	139	72		18	13	10	118	490	477	425	192
27	143	69		18	13	18	122	490	464	438	188
28	143	50		17	12	24	136	477	477	438	180
29	139	50			13	26	132	490	477	425	192
30	139	48			15	25	132	464	464	425	168
31	139				15		114		451	425	

NOTE.—Discharge determined from two well-defined rating curves, one used Oct. 1 to Dec. 14, the other Feb. 21 to Sept. 30. Canal frozen Dec. 15 to Feb. 20; discharge not determined. Canal dry Apr. 8–25. Gage not operating Sept. 5–10; mean flow estimated at 293 second-feet.

Monthly discharge of West Side canal near Collinston, Utah, for the year ending Sept. 30, 1915.

Month.	Discharge in second-feet.			Run-off (total in acre-feet).	Accuracy.
	Maximum.	Minimum.	Mean.		
October	183	139	156	9,590	B.
November	139	48	86.6	5,150	B.
December 1-14	52	45	48.5	1,350	B.
February 21-28	23	17	18.8	298	B.
March	22	12	17.9	1,100	B.
April	25	0	6.43	383	B.
May	176	24	107	6,580	A.
June	516	87	308	18,300	A.
July	503	451	479	29,500	A.
August	490	301	416	25,600	A.
September	451	168	255	15,200	A.

HAMMOND (EAST SIDE) CANAL NEAR COLLINSTON, UTAH.

Location.—In the NW. ¼, sec. 34, T. 13 N., R. 2 W., at Wheelon siding on the Oregon Short Line Railroad, about 400 feet below the penstock of the Utah Power & Light Co. and 4 miles north of Collinston, Boxelder County.

Records available.—June 1, 1912, to September 30, 1915.

Gage.—Friez water-stage recorder on right bank, installed May 22, 1914, at same site and datum as inclined staff used until that date.

Discharge measurements.—Made from footbridge at gage or by wading.

Channel and control.—Bed composed of earth and gravel. Control not well defined. Canal subject to small slides which no doubt affect stage-discharge relation.

Extremes of discharge.—Maximum stage recorded during year, 4.35 feet August 27 (discharge, 102 second-feet). Canal dry October 16. No record during winter.

1912–1915: Maximum stage recorded, 4.50 feet July 18, 1912, and June 11, 1913 (discharge, 113 second-feet). Canal dry at times every year.

Winter flow.—No record was kept during winter, but canal was dry at least part of the time.

Diversions.—Water is taken from this canal about 400 feet above the gage for the power plant.

Regulation.—Flow can be regulated at the head gates and by means of a wasteway at the power plant forebay. Is also affected by the operation of the plant.

Accuracy.—Records good.

Canal diverts water on the east side of Bear River in SW. ¼ sec. 23 at the same diversion dam as the West Side canal. Part of the water is used by the Wheelon plant of the Utah Power & Light Co., and the rest is either wasted into the river or is used for irrigation.

Discharge measurements of Hammond (East Side) canal near Collinston, Utah, during the year ending Sept. 30, 1915.

Date.	Made by—	Gage height.	Discharge.	Date.	Made by—	Gage height.	Discharge.
		Feet.	*Sec.-ft.*			*Feet.*	*Sec.-ft.*
May 14	Lynn Crandall	3.48	70	June 29	Lynn Crandall	4.00	90
28	Employees of Utah Power & Light Co.	1.90	16.8	July 27	Employees of Utah Power & Light Co.	4.27	95
30	do	2.80	45.6	Aug. 27	L. W. Jordan	4.35	102

Daily discharge, in second-feet, of Hammond (East Side) canal near Collinston, Utah, during the year ending Sept. 30, 1915.

Day.	Oct.	Apr.	May.	June.	July.	Aug.	Sept.
1	48	....	73	44	86	103	103
2	48	....	70	45	86	103	103
3	52	....	41	43	83	103	103
4	54	....	33	44	86	103	45
5	50	....	50	44	90	103	47
6	48	....	50	44	86	103	39
7	50	....	50	44	93	98	39
8	38	....	48	44	98	93	38
9	22	....	50	45	88	65	37
10	23	....	51	46	98	38	38
11	23	....	52	45	93	38	32
12	23	....	62	45	98	38	25
13	23	....	73	44	98	38	25
14	22	....	70	44	93	39	25
15	6.5	....	68	56	98	41	25
16	0	19	68	63	96	53	25
17	....	19	68	62	93	65	25
18	....	19	70	61	96	96	47
19	....	19	70	82	93	96	51
20	....	19	47	88	93	96	51
21	....	43	13	96	93	96	51
22	....	52	6	99	96	98	51
23	....	52	6	93	96	103	51
24	....	52	5	90	96	103	53
25	....	51	7	88	98	103	51
26	....	50	16	83	103	103	38
27	....	50	16	88	103	106	27
28	....	50	16	86	106	103	27
29	....	50	17	88	106	103	25
30	....	50	30	86	106	103	17
31	....	....	44	....	103	103	....

NOTE.—Discharge determined from three fairly well defined rating curves, one applicable Oct. 1-16, another Apr. 16 to June 14, and the third from June 23 to Sept. 30. Discharge June 15-22 determined by indirect method for shifting control. No records obtained Oct. 17 to Apr. 15, but canal was probably dry most if not all of the time.

Monthly discharge of Hammond (East Side) canal near Collinston, Utah, for the year ending Sept. 30, 1915.

Month.	Discharge in second-feet.			Run-off (total in acre-feet).	Accuracy.
	Maximum.	Minimum.	Mean.		
October 1-16	54	0	33.4	1,050	B.
April 16-30	52	19	39.7	1,180	B.
May	73	5	43.2	2,660	B.
June	99	43	64.3	3,830	B.
July	106	83	94.4	5,800	B.
August	106	38	85.0	5,230	B.
September	103	17	43.8	2,610	B.

WEBER RIVER BASIN.

WEBER RIVER NEAR OAKLEY, UTAH.

LOCATION.—In the NE. ¼ sec. 15, T. 1 S., R. 6 E., near mouth of canyon about 3 miles above Oakley, Summit County. South Fork of Weber River enters 2 miles above station and Beaver or Kamas Creek 6 miles below.

DRAINAGE AREA.—163 square miles.

RECORDS AVAILABLE.—October 22, 1904, to September 30, 1915.

GAGE.—Inclined staff on left bank about a quarter of a mile above the upper canal diverting from Weber River; ready daily by John Franson.

DISCHARGE MEASUREMENTS.—Made from cable at gage or by wading.

CHANNEL AND CONTROL.—Bed composed of gravel and boulders. One channel at all stages; steep and rough, but apparently fairly permanent.

Extremes of discharge.—Maximum stage recorded during year, 6.3 feet at 7 a. m. June 11 (discharge, 1,230 second-feet); minimum stage, 4.05 feet August 20 to September 2, September 9, 10, 21–25 (discharge, 62 second-feet).

1904–1915: Maximum stage recorded, 8.5 feet July 6, 1907, and June 5–7, 1909 (discharge, 4,010 second-feet); minimum stage, 4.0 feet for periods during February and March, 1908 (discharge, 46 second-feet).

Winter flow.—River freezes at this station and stage-discharge relation is also affected by slush and anchor ice. Winter flow is, however, fairly constant and winter discharge has been determined by comparison with record of flow at Devils Slide.

Diversions.—None above station, but several canals take out below for irrigation around Oakley and between Oakley and Kamas.

Regulation.—None.

Accuracy.—Open-water records fair.

Discharge measurements of Weber River near Oakley, Utah, during the year ending Sept. 30, 1915.

Date.	Made by—	Gage height.	Discharge.
		Feet.	*Sec.-ft.*
Apr. 21	L. W. Jordan	4.88	312
Aug. 16	Lynn Crandall	4.10	70

Daily discharge, in second-feet, of Weber River near Oakley, Utah, for the year ending Sept. 30, 1915.

Day.	Oct.	Nov.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.
1	103	103	80	91	91	365	770	415	91	62
2	103	103	80	91	91	320	770	390	91	62
3	103	103	80	91	91	300	765	365	91	91
4	115	103	80	91	91	280	672	342	91	80
5	115	103	80	91	103	280	640	320	91	80
6	115	103	80	91	103	260	640	300	91	80
7	129	103	78	84	103	240	640	280	91	70
8	129	91	75	77	115	222	640	260	91	70
9	143	91	70	70	115	240	770	240	91	62
10	143	91	75	70	115	280	1,070	222	80	62
11	143	91	85	70	143	320	1,230	205	80	143
12	129	91	91	70	143	365	990	205	80	115
13	129	91	91	70	173	440	770	189	80	103
14	129	91	91	70	173	492	705	189	80	103
15	129	....	91	70	189	580	738	173	80	91
16	129	....	91	70	205	640	840	158	70	91
17	129	....	91	70	260	705	1,070	143	70	80
18	129	....	91	70	260	770	990	143	70	80
19	129	....	91	70	280	640	990	129	70	70
20	115	....	91	70	300	465	990	129	62	70
21	115	....	91	91	320	415	952	129	62	62
22	115	....	91	91	320	415	915	129	62	62
23	115	....	91	91	300	415	840	115	62	62
24	115	....	91	91	280	415	770	115	62	62
25	115	....	91	91	280	415	765	115	62	62
26	115	....	91	91	260	440	640	115	62	143
27	115	....	91	91	365	465	580	103	62	129
28	115	....	91	91	465	520	520	103	62	129
29	115	....	....	91	580	580	465	103	62	115
30	103	....	....	91	415	640	440	103	62	103
31	103	....	....	91	....	705	....	91	62	....

Note.—Discharge determined from a fairly well defined rating curve. Mean flow estimated on account of ice as follows: Nov. 15–30, 80 second-feet; Dec. 1–31, 75 second-feet; Jan. 1–31, 80 second-feet. Gage read only twice a week Feb. 1 to Mar. 19; discharge interpolated for days on which gage was not read.

Monthly discharge of Weber River near Oakley, Utah, for the year ending Sept. 30, 1915.

Month.	Discharge in second-feet.			Run-off (total in acre-feet).	Accuracy.
	Maximum.	Minimum.	Mean.		
October	143	103	120	7,380	B.
November	163	....	87.9	5,230	B.
December	....	....	[a] 75	4,610	C.
January	....	....	[a] 80	4,920	C.
February	91	70	86.1	4,780	C.
March	91	70	82.2	5,050	B.
April	580	91	225	13,400	B.
May	770	222	439	27,000	B.
June	1,230	440	782	46,500	B.
July	415	91	194	11,900	B.
August	91	62	74.9	4,610	B.
September	14[illegible]	62	86.5	5,150	B.
The year	1,230	....	194	141,000	

[a] Estimated.

WEBER RIVER AT DEVILS SLIDE, UTAH.

Location.—In the SW. ¼ sec. 19, T. 4 N., R. 4 E., about 300 feet back of hotel, half a mile east of railroad station at Devils Slide, Morgan County, and 2,000 feet upstream from lower Union Pacific Railroad bridge. Lost Creek enters from the right a quarter of a mile above station.

Drainage area.—1,090 square miles.

Records available.—February 1, 1905, to September 30, 1915.

Gage.—Vertical staff on left bank just above cable installed September 21, 1915, at same site and datum as the inclined staff used March 9, 1912, to September 20, 1915. Original gage, used February 1, 1905, to March 8, 1912, was an inclined staff at the same datum but on the opposite bank of river; read once daily by A. E. Lucas.

Discharge measurements.—Made from cable or by wading.

Channel and control.—Bed composed of gravel and sand; shifting. One channel at all stages.

Extremes of discharge.—Maximum stage recorded during year, 4.20 feet at 1 p. m. June 11 (discharge, 1,430 second-feet); minimum stage, 1.78 feet at 1 p. m. September 1 (discharge, 48 second feet).

1905–1915: Maximum stage recorded, 7.0 feet May 28 and June 4–8, 1909 (discharge, 5,120 second-feet); minimum stage, 1.4 feet July 29, to August 10 and August 14 to September 2, 1905 (discharge, 50 second-feet). Stage-discharge relation in 1905 and 1915 not the same.

Winter flow.—Stream does not freeze at this point, but there is occasionally a little shore ice; stage, discharge relation not seriously affected; open-water rating assumed applicable.

Diversions.—A number of canals divert water from Weber River and its tributaries in the vicinity of Oakley and Kamas for use for irrigation and domestic supply.

Regulation.—None.

Accuracy.—Records good.

Discharge measurements of Weber River at Devils Slide, Utah, during the year ending Sept. 30, 1915.

Date.	Made by—	Gage height.	Discharge.	Date.	Made by—	Gage height.	Discharge.
		Feet.	*Sec.-ft.*			*Feet.*	*Sec.-ft.*
Nov. 13	J. J. Sanford	2.40	235	Aug. 17	Lynn Crandall	1.88	64
Jan. 14	L. W. Jordan	2.28	184	Sept. 21	L. W. Jordan	2.15	132
Apr. 22	.....do	3.41	771				

Daily discharge, in second-feet, of Weber River at Devils Slide, Utah, for the year ending Sept. 30, 1915.

Day.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.
1	152	244	152	158	215	215	380	786	947	273	68	48
2	152	235	132	142	215	215	380	721	1,270	246	68	50
3	158	235	227	158	219	215	501	640	1,180	224	68	73
4	271	227	215	195	219	188	635	568	924	224	68	110
5	244	203	215	165	188	215	501	500	1,180	233	68	105
6	235	195	203	158	195	227	462	434	1,270	224	75	97
7	235	215	195	215	203	215	446	407	1,070	212	75	97
8	330	227	132	142	215	195	545	370	963	193	68	97
9	545	227	126	195	215	188	534	330	1,120	162	75	97
10	424	215	105	203	235	203	462	320	1,340	139	75	97
11	391	215	142	176	258	215	479	301	1,430	118	75	124
12	370	227	142	195	280	215	462	273	1,360	105	75	172
13	340	235	142	176	235	235	496	273	1,090	87	75	172
14	320	235	113	195	195	235	540	301	924	75	75	155
15	290	203	100	195	176	258	545	402	849	68	75	155
16	290	176	121	176	235	305	605	386	820	64	75	155
17	280	158	132	165	244	280	695	417	924	68	64	148
18	280	165	176	158	235	305	719	598	924	64	68	148
19	280	176	176	142	215	280	738	568	849	59	64	139
20	271	188	165	142	219	271	770	511	780	59	64	139
21	258	176	152	158	219	305	780	488	753	59	59	133
22	258	176	121	142	215	320	773	455	753	59	59	133
23	258	176	113	142	203	380	721	444	702	64	55	118
24	258	235	132	142	195	462	659	434	659	68	55	118
25	258	227	195	148	203	501	659	511	580	75	55	148
26	258	203	203	195	215	617	610	580	511	75	55	155
27	258	203	195	219	215	605	610	511	461	68	55	182
28	258	215	176	235	176	501	628	455	412	68	55	175
29	258	195	158	235	....	617	721	539	355	64	55	165
30	244	165	188	219	....	446	849	715	320	64	50	165
31	244	....	176	219	....	380	....	715	....	64	50	....

NOTE.—Discharge determined from two well-defined curves; one applicable Oct. 1 to Apr. 12, the other Apr. 21 to Sept. 30; indirect method for shifting channels used Apr. 13–20. Some shore ice during winter, but stage-discharge relation apparently not affected.

Monthly discharge of Weber River at Devils Slide, Utah, for the year ending Sept. 30 1915.

Month.	Discharge in second-feet.			Run-off (total in acre-feet).	Accuracy.
	Maximum.	Minimum.	Mean.		
October	545	152	280	17,200	A.
November	244	158	206	12,300	A.
December	227	100	159	9,780	B.
January	235	142	178	10,900	B.
February	280	176	216	12,000	A.
March	617	188	316	19,400	B.
April	849	380	597	35,500	B.
May	786	273	482	29,600	A.
June	1,430	320	891	53,000	A.
July	273	59	117	7,190	A.
August	75	50	65.2	4,010	B.
September	182	48	129	7,680	B.
The year	1,430	48	302	219,000	

WEBER RIVER NEAR PLAIN CITY, UTAH.

Location.—In the SE. ¼ sec. 5, T. 6 N., R. 2 W., at county highway bridge on road to Ogden, Weber County, a mile from Plain City, about a mile below mouth of Fourmile Creek, 2 miles below Mill Creek, 6 miles below Ogden River, and 6 miles above point where Weber River empties into the Great Salt Lake.

Drainage area.—2,060 square miles.

Records available.—May 14, 1905, to September 30, 1915. Records were obtained at this point in 1904 by the State of Utah under the direction of the State engineer.

Gage.—Chain gage on upstream side of highway bridge installed November 12, 1914, at same datum as old gage. Gage used 1904 to November 11, 1914, was painted on upstream side of middle pier of bridge.

Discharge measurements.—Made from bridge or by wading; conditions fair.

Channel and control.—Bed composed of sand and mud, shifting. One channel at all stages; banks moderately high.

Extremes of discharge.—Maximum stage recorded during year, 9.3 feet at 11 a. m. April 21 (discharge, 1,880 second-feet); minimum stage, 1.95 feet at 6 a. m. July 14 and 8 a. m. July 15 (discharge, zero second-feet).

1904–1915: Maximum stage recorded, 19.1 feet June 6, 1909 (discharge, 7,580 second-feet); minimum stage, 1.95 feet July 14 and 15, 1915 (discharge, zero).

Winter flow.—River occasionally freezes over during very cold weather; discharge for such periods determined by comparison with record of flow at Devils Slide.

Diversion.—In the summer practically the entire flow of Weber River above station is used for irrigation.

Regulation.—None.

Accuracy.—Records fair.

Discharge measurements of Weber River near Plain City, Utah, during the year ending Sept. 30, 1915.

Date.	Made by—	Gage height.	Discharge.	Date.	Made by—	Gage height.	Discharge.
		Feet.	*Sec.-ft.*			*Feet.*	*Sec.-ft.*
Nov. 12	J. J. Sanford	4.78	514	Apr. 23	L. W. Jordan	8.99	1,730
Jan. 13	L. W. Jordan	[a]5.14	314	Aug. 17	Lynn Crandall	2.00	[b].1

[a] Stage-discharge relation affected by ice.
[b] Estimated.

Daily discharge, in second-feet, of Weber River near Plain City, Utah, for the year ending Sept. 30, 1915.

Day.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.
1	210	470	445	....	600	470	898	1,290	538	16	0.1	0.1
2	210	470	445	....	590	520	868	1,510	616	14	.1	.1
3	229	470	445	....	580	520	1,090	1,400	1,150	6	.1	2
4	248	470	445	....	570	495	1,500	1,260	1,360	2	.1	2
5	308	470	445	....	545	470	1,190	1,120	1,220	2	.1	2
6	352	470	470	....	570	495	1,090	896	1,290	2	.1	2
7	445	445	470	....	495	495	1,020	806	1,360	2	.1	1
8	570	445	420	....	420	495	1,190	668	1,190	2	.1	.1
9	700	445	396	....	470	470	1,330	564	986	2	.1	.1
10	726	445	352	....	622	470	1,220	486	866	.1	.1	2
11	754	445	352	....	596	470	1,120	370	986	.1	.1	5
12	754	470	352	....	648	470	1,120	266	1,020	.1	.1	7
13	700	445	....	....	648	520	1,080	190	866	.1	.1	190
14	648	445	....	....	596	596	1,050	190	694	.0	.1	266
15	622	445	....	....	520	622	1,330	154	486	.0	.1	306
16	596	445	....	....	520	726	1,510	120	370	.1	.1	348
17	596	445	....	....	520	700	1,580	120	392	.1	.1	266
18	622	445	....	....	596	674	1,730	172	414	.1	.1	246
19	596	352	....	....	570	648	1,800	486	392	.1	.1	256
20	570	396	....	....	495	622	1,800	462	348	1.	.1	190
21	570	420	....	....	520	648	1,880	462	306	1	.1	168
22	545	396	....	....	520	648	1,800	462	286	2	.1	140
23	495	420	....	....	520	754	1,770	486	226	2	.1	128
24	495	445	....	....	495	838	1,620	414	190	1	.1	107
25	520	445	....	....	495	898	1,400	392	104	.1	.1	104
26	520	495	....	....	545	1,190	1,330	438	32	.1	.1	208
27	495	520	....	340	520	1,190	1,190	438	58	.1	.1	266
28	495	470	....	450	520	1,090	1,050	392	22	.1	.1	266
29	495	420	....	550	....	1,150	926	348	44	.1	.1	256
30	495	420	....	590	....	1,190	1,050	414	22	.1	.1	246
31	470	....	....	600	....	1,090	....	438	....	.1	.1	....

NOTE.—Discharge determined from two poorly defined rating curves, one used Oct. 1 to Apr. 4 and the other Apr. 7 to Sept. 30. Indirect method for shifting control used Apr. 5 and 6. Mean discharge estimated on account of ice as follows: Dec. 13–31, 315 second-feet; Jan. 1–26, 310 second-feet; Jan. 27 to Feb. 3 as in table.

Monthly discharge of Weber River near Plain City, Utah, for the year ending Sept. 30, 1915.

Month.	Discharge in second-feet.			Run-off (total in acre-feet).	Accuracy.
	Maximum.	Minimum.	Mean.		
October	754	210	518	31,900	C.
November	520	352	446	26,500	C.
December	470	....	356	21,900	D.
January	600	....	342	21,000	D.
February	648	420	547	30,400	C.
March	1,190	470	698	42,900	B.
April	1,880	868	1,320	78,600	B.
May	1,510	120	565	34,100	C.
June	1,360	22	594	35,300	C.
July	16	0	1.82	112	
August	.1	.1	.10	6	
September	348	.1	133	7,910	C.
The year	1,880	0	456	331,000	

JORDAN RIVER BASIN.

JORDAN RIVER NEAR LEHI, UTAH.

Location.—In sec. 25, T. 5 S., R. 1 W., about 800 feet below pump house at outlet of Utah Lake and 4 miles southwest of Lehi, Utah County.

Drainage area.—2,570 square miles.

Records available.—May 30 to December 31, 1904, and July 22, 1913, to September 30, 1915.

Gage.—Vertical staff in stilling well on right bank about 25 feet above bridge, January 6, 1914, to September 30, 1915; read twice daily by W. A. Knight. Gage used May 30 to December 31, 1904, and July 22, 1913, to January 5, 1914, was vertical staff nailed to upstream side of right bridge abutment; same datum 1904–15.

Discharge measurements.—Made from cable about 400 feet above gage or by wading.

Channel and control.—Bed composed of clay and hardpan. Banks clean and low; not subject to overflow. One channel at gage. Area slightly constricted below by highway bridge. Slope is very flat, and stage-discharge relation may be slightly affected when flashboards are in place at the old impounding dam in Jordan Narrows, about 6 miles north of the station (about 12 miles by river).

Extremes of discharge.—Maximum stage recorded during year, 5.50 feet at 8.30 a. m., July 17 (discharge, 755 second-feet); minimum stage, 1.98 feet October 15 to December 16 (discharge, 112 second-feet).

1904, 1913–1915: Maximum stage recorded, 5.78 feet May 31, 1914 (discharge, 794 second-feet); minimum stage, 0.75 foot October 17–22, 1904 (discharge, 23 second-feet).

Winter flow.—Stage-discharge relation seldom seriously affected by ice. During unusually cold weather, however, the river sometimes freezes over below station and the open-channel rating is not applicable.

Diversions.—None above station. In the Narrows about 6 miles north (several miles farther by river) a number of large canals divert for irrigation in Salt Lake Valley and for use by the smelters, etc., in the vicinity of Garfield.

Regulation.—During the irrigation season when the natural flow from Utah Lake is inadequate for the demands below, water is pumped from the lake into Jordan River. A pumping plant with a capacity of about 800 cubic feet per second is at outlet of lake, 800 feet above gage, and is owned and operated by various canal companies interested in the stream.

Accuracy.—Records good. Wind has a very marked effect on the flow of river and records may be subject to error at times on that account.

Discharge measurements of Jordan River near Lehi, Utah, during the year ending Sept. 30, 1915.

Date.	Made by—	Gage height.	Discharge.
		Feet.	*Sec.-ft.*
Apr. 7	J. J. Sanford[a]	5.05	614
Aug. 5	L. W. Jordan[b]	5.12	667
14	Lynn Crandall[b]	5.03	660

[a] Gravity flow.

[b] Pumps running.

Daily discharge, in second-feet, of Jordan River near Lehi, Utah, for the year ending Sept. 30, 1915.

Day.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.
1	331	112	112	450	488	596	636	646	572	702	644	640
2	352	112	112	454	484	600	638	646	614	702	676	640
3	338	112	112	450	493	604	636	521	589	702	674	618
4	318	112	112	476	497	610	631	631	583	699	674	526
5	326	112	112	455	497	608	636	625	594	699	674	478
6	323	112	112	457	499	610	686	629	583	702	654	552
7	299	112	112	457	499	612	638	631	577	697	570	566
8	321	112	112	459	499	614	638	629	572	695	431	566
9	338	112	112	459	509	617	636	625	572	695	578	566
10	346	112	112	463	517	619	463	625	585	697	602	556
11	323	112	112	465	533	619	463	646	579	697	650	506
12	346	112	112	465	549	619	562	583	472	697	630	510
13	345	112	112	465	558	621	646	614	640	697	644	472
14	228	112	112	469	566	621	642	610	683	697	656	433
15	112	112	112	465	568	621	625	608	680	727	658	433
16	112	112	112	471	572	619	636	604	685	744	660	433
17	112	112	200	471	575	623	633	606	678	755	660	435
18	112	112	390	471	575	627	642	610	680	691	662	435
19	112	112	446	472	575	631	640	614	680	706	660	433
20	112	112	446	474	575	629	625	614	685	727	664	433
21	112	112	446	474	577	631	642	614	680	739	664	433
22	112	112	446	474	577	636	636	610	674	733	662	433
23	112	112	444	476	579	636	631	606	674	725	662	433
24	112	112	450	482	579	640	633	425	689	722	660	433
25	112	112	452	476	583	639	638	521	704	720	656	359
26	112	112	452	472	587	637	646	602	704	722	666	260
27	112	112	454	474	591	636	650	602	710	720	666	247
28	112	112	454	474	594	642	652	591	704	695	662	276
29	112	112	455	478	....	642	656	614	702	680	662	282
30	112	112	457	482	....	625	646	577	702	676	660	282
31	112	....	457	484	....	640	....	572	....	662	636	....

NOTE.—Discharge determined from two well-defined rating curves, one applicable Oct. 1 to June 12, the other June 13 to Sept. 30. Discharge Oct. 14 and Mar. 25 and 26 interpolated.

Monthly discharge of Jordan River near Lehi, Utah, for the year ending Sept. 30, 1915.

Month.	Discharge in second-feet.			Run-off (total in acre-feet).	Accuracy.
	Maximum.	Minimum.	Mean.		
October	352	112	208	12,800	B.
November	112	112	112	6,660	B.
December	457	112	266	16,400	B.
January	484	450	468	28,800	B.
February	594	484	546	30,300	B.
March	642	596	623	38,300	B.
April	656	463	624	37,100	B.
May	646	425	602	37,000	B.
June	710	472	642	38,200	B.
July	755	662	707	43,500	B.
August	676	431	644	39,600	B.
September	640	247	456	27,100	B.
The year	755	112	491	356,000	

SUMMIT CREEK NEAR SANTAQUIN, UTAH.

LOCATION.—In sec. 12, T. 10 S., R. 1 E., at power plant of Utah Power & Light Co. about a mile from Santaquin, Utah County.

DRAINAGE AREA.—27.5 square miles.

RECORDS AVAILABLE.—March 8, 1910, to September 30, 1915.

Gage.—Hook gage at a 4-foot, rectangular, sharp-crested weir with complete end contractions, in the power-plant tailrace, and a vertical staff above a similar 5-foot weir in the main creek; there is also a vertical staff fastened to a cottonwood tree on left bank of creek, about 250 yards above power house.

Discharge measurements.—Made by wading.

Channel and control.—Bed composed of rocks and coarse gravel; may shift slightly; banks high and clean. Controls for both gages formed by weirs. One channel at all stages at upper gage in creek.

Extremes of discharge.—Maximum discharge reported during year, 48.9 second-feet May 14; minimum discharge reported, 4.2 second-feet February 4.

1910–1915: Maximum discharge reported, 150 second-feet May 10, 1910; minimum discharge reported, 2.3 second-feet November 11, 1911.

Winter flow.—Stage-discharge relation not seriously affected by ice; minimum discharge usually occurs during winter.

Diversions.—Above all irrigation diversions.

Regulation.—Flow may be affected at times by operation of power plant.

Cooperation.—Records furnished by Utah Power & Light Co.

The following discharge measurement was made by L. C. Monson, of the Utah Power & Light Co.:

May 15, 1915: Gage height, 1.08 feet; discharge, 20.3 second-feet. Measurement made at staff gage in creek about 250 yards above power house.

Daily discharge, in second-feet, of Summit Creek near Santaquin, Utah, for the year ending Sept. 30, 1915.

Day.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.
1	11.1	10.4	8.5	7.7	6.6	5.5	8.2	27.5	45.1	16.1	10.9	9.5
2	10.9	10.3	8.5	7.2	7.0	5.6	8.2	26.5	44.8	15.9	11.0	9.5
3	22.5	10.2	8.8	7.2	5.4	5.6	9.7	26.5	35.3	16.5	10.9	9.5
4	13.5	10.2	9.0	7.7	4.2	5.5	10.4	25.4	39.2	16.0	10.6	9.8
5	11.4	10.1	9.2	7.2	5.0	5.5	11.4	20.9	37.6	16.8	10.0	9.9
6	11.1	9.9	9.2	8.0	5.1	5.2	11.6	20.2	34.4	16.7	10.9	9.7
7	11.6	9.9	8.7	8.0	5.5	5.5	12.0	20.0	33.2	14.9	11.0	9.5
8	14.1	9.9	8.0	7.5	6.0	5.5	14.4	20.0	34.1	15.1	11.0	9.4
9	15.4	9.9	6.4	7.4	6.0	5.5	14.0	19.7	39.0	13.7	11.0	9.2
10	11.8	9.7	8.0	7.4	4.9	5.5	14.0	21.9	41.8	13.5	10.9	9.2
11	11.1	9.5	13.1	7.2	6.4	5.5	14.4	26.2	38.3	13.3	10.6	9.5
12	10.9	9.5	5.8	7.2	5.5	5.5	17.6	28.8	37.0	13.7	10.5	9.5
13	10.9	9.4	7.3	6.9	6.3	5.5	19.0	36.9	32.8	13.4	10.9	9.2
14	10.9	9.2	5.5	6.9	5.0	5.5	20.0	48.9	28.2	12.7	10.5	9.2
15	10.7	9.2	5.5	6.2	4.8	5.5	20.2	47.7	27.4	12.7	10.2	9.4
16	10.5	9.0	5.5	5.8	5.9	5.8	22.6	44.1	27.4	12.8	10.4	9.2
17	10.3	9.0	6.4	6.9	5.6	6.0	22.6	43.6	26.5	12.9	10.4	9.2
18	10.1	8.8	8.8	7.0	5.6	6.0	27.7	44.9	26.4	11.9	10.0	9.4
19	10.1	8.7	7.8	7.2	5.5	6.0	28.0	45.1	25.4	11.9	10.0	9.4
20	10.1	8.7	7.8	7.0	5.5	6.0	34.9	37.7	24.6	14.2	9.7	8.5
21	10.1	8.7	7.7	7.4	5.5	6.0	36.6	34.3	23.3	11.9	9.5	9.2
22	10.1	8.5	7.4	4.9	5.5	6.0	33.5	33.2	21.8	11.4	9.8	8.8
23	10.1	8.3	7.7	4.6	5.5	6.3	33.2	31.2	21.7	11.7	9.7	8.7
24	9.9	8.5	7.4	5.8	5.5	6.3	28.2	31.3	21.8	11.7	9.5	9.0
25	10.1	8.7	7.4	7.2	5.5	6.3	27.0	32.6	20.5	11.6	9.5	9.0
26	9.9	8.5	7.5	7.0	5.5	6.8	26.2	32.1	19.1	11.4	9.7	9.0
27	10.8	8.5	7.5	6.6	5.5	7.0	29.4	30.9	18.0	11.2	9.5	8.5
28	10.5	8.5	8.0	6.6	5.5	7.5	33.5	31.8	17.8	11.2	9.3	8.5
29	10.5	8.5	7.5	6.8	....	7.8	35.4	37.2	16.7	11.0	9.3	9.0
30	10.6	8.2	7.4	7.2	....	8.0	33.5	46.2	16.3	10.9	9.7	8.7
31	10.6	....	7.4	7.0	....	8.2	....	37.6	....	11.0	9.2	....

Note.—Monthly Discharge represents the combined flow of tailrace and main creek.

Monthly discharge of Summit Creek near Santaquin, Utah, for the year ending Sept. 30, 1915.

Month.	Discharge in second-feet.			Run-off (total in acre-feet).
	Maximum.	Minimum.	Mean.	
October	15.4	9.9	11.4	701
November	10.4	8.2	9.21	548
December	13.1	5.5	7.76	477
January	8.0	4.6	6.93	426
February	7.0	4.2	5.56	309
March	8.2	5.2	6.08	374
April	36.6	8.2	21.9	1,300
May	48.9	19.7	32.6	2,000
June	45.1	16.3	29.2	1,740
July	16.8	10.9	13.2	812
August	11.0	9.2	10.2	627
September	9.9	8.5	9.20	547
The year	48.9	4.2	13.6	9,860

NOTE.—Monthly discharge computed by engineers of the United States Geological Survey.

PETEETNEET CREEK NEAR PAYSON, UTAH.

LOCATION.—In the SE. ¼ SW. ¼ sec. 29, T. 9 S, R. 2 E., about half a mile above power canal intake and 3 miles above Payson, Utah County.

DRAINAGE AREA.—28 square miles.

RECORDS AVAILABLE.—August 1, 1910, to September 30, 1915; miscellaneous measurements, 1909–10.

GAGE.—Inclined staff on left bank.

DISCHARGE MEASUREMENTS.—Made from footbridge at gage or by wading.

CHANNEL AND CONTROL.—Bed composed of rocks and gravel; may shift during extreme high water. Banks high and not subject to overflow.

EXTREMES OF DISCHARGE.—Maximum stage recorded during year, 3.20 feet April 24 (discharge, 93.0 second-feet); minimum stage, 2.10 feet January 22 (discharge, 4.3 second-feet).

1910–1915: Maximum stage recorded, 4.02 feet May 10, 1914 (discharge, 200 second-feet); minimum stage, 1.44 feet December 28, 1912 (discharge, 1.7 second-feet).

WINTER FLOW.—Stage discharge relation affected by ice for short periods. Open-water rating curves can generally be used except for a few days.

DIVERSIONS.—None above station.

REGUATION.—City of Payson has constructed several small reservoirs above station which regulate the flow to some extent.

COOPERATION.—Since January 1, 1911, records have been furnished by the United States Reclamation Service.

Discharge measurements of Peteetneet Creek near Payson, Utah, during the year ending Sept. 30, 1915.

Date.	Made by—	Gage height.	Discharge.	Date.	Made by—	Gage height.	Discharge.
		Feet.	*Sec.-ft.*			*Feet.*	*Sec.-ft.*
Oct. 16	B. M. Hall, jr	2.20	7.0	Apr. 21	B. M. Hall, jr	3.16	86
Feb. 9	do	2.14	6.7	May 8	R. M. Adams	2.58	29.3
Mar. 18	do	2.15	7.1	13	do	2.59	30.3
31	do	2.20	8.3	18	do	2.69	35.6
Apr. 14	do	2.57	27.5	June 17	do	2.36	12.5
20	do	3.02	75	July 14	do	2.30	9.8
21	do	3.13	87	Sept. 6	do	2.25	7.8

Daily discharge, in second-feet, of Peteetneet Creek near Payson, Utah, for the year ending Sept. 30, 1915.

Day.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.
1	8.1	6.6	7.8	6.8	6.3	6.8	7.2	38.6	26.5	12.4	10.0	9.4
2	8.2	6.3	8.1	6.8	6.0	6.5	7.7	36.2	27.3	11.7	10.0	9.7
3	8.4	6.3	8.0	6.8	5.8	6.3	8.0	37.2	28.1	11.0	10.0	10.0
4	8.4	6.3	7.8	7.1	5.6	5.6	8.4	38.1	28.9	11.0	10.0	10.0
5	8.4	6.6	7.8	7.4	5.3	6.8	9.2	38.6	29.7	11.0	9.7	10.0
6	8.6	6.8	7.8	7.1	5.3	6.3	10.0	39.0	29.7	10.5	9.4	9.7
7	8.7	6.8	7.4	6.8	5.3	5.8	11.3	33.6	29.7	10.0	9.4	9.4
8	8.4	6.8	7.1	6.7	5.3	5.5	12.6	28.1	28.5	10.0	9.4	9.4
9	8.1	6.6	7.2	6.6	5.3	5.3	13.9	29.8	27.3	10.0	9.2	9.4
10	7.8	6.3	7.4	6.6	5.6	5.0	15.1	31.6	26.5	10.5	9.0	9.2
11	7.4	6.3	7.9	6.6	5.8	4.8	17.8	29.0	25.8	11.0	9.5	9.0
12	6.9	6.3	8.4	6.8	5.7	4.8	20.5	26.5	23.8	10.5	10.0	8.4
13	6.8	6.2	8.2	7.1	5.6	4.8	23.9	26.9	21.8	10.0	10.0	7.8
14	6.8	6.1	8.1	7.2	5.7	5.1	27.3	27.3	20.4	10.0	10.0	7.3
15	6.8	6.4	8.0	7.4	5.8	5.3	28.5	31.8	19.1	10.0	10.2	6.8
16	7.1	6.6	7.8	7.0	6.0	5.4	29.7	36.2	17.8	9.7	10.5	6.6
17	7.4	6.6	7.4	7.0	6.1	5.6	35.4	37.6	16.5	9.4	10.1	6.3
18	7.1	6.6	7.1	7.0	5.8	5.6	41.0	39.0	15.8	9.4	9.7	6.3
19	6.8	6.7	7.0	7.0	5.6	5.6	55.5	37.0	15.1	9.4	9.6	6.3
20	6.6	6.8	6.8	7.5	5.9	5.7	70.0	35.3	14.6	9.7	9.4	6.6
21	6.3	7.0	6.8	4.6	6.1	5.8	78.6	33.4	14.1	10.0	9.4	6.8
22	6.6	7.1	6.8	4.3	6.2	6.1	87.1	31.6	13.4	10.0	9.4	7.1
23	6.8	7.4	7.1	5.4	6.3	6.3	90.0	30.6	12.6	10.0	9.0	7.4
24	7.1	7.7	7.4	6.9	6.3	6.3	93.0	29.7	12.0	10.2	8.7	7.8
25	7.4	7.7	7.0	7.0	6.3	6.3	66.0	28.1	11.5	10.5	8.7	8.1
26	7.4	7.7	6.6	6.8	6.6	6.6	39.0	26.5	12.0	10.0	8.7	8.4
27	7.4	7.6	6.8	6.4	6.8	6.8	50.6	24.9	12.5	9.4	8.6	8.7
28	7.6	7.4	7.1	6.4	6.8	6.8	62.3	23.4	11.8	9.7	8.4	9.1
29	7.7	7.4	6.8	6.4	....	6.8	51.6	23.4	11.0	10.0	8.6	9.4
30	7.2	7.4	6.6	6.9	....	6.8	41.0	23.4	11.7	10.0	8.7	9.0
31	7.8	....	6.7	6.7	....	6.8	....	24.9	....	10.0	9.1	....

NOTE.—Discharge Jan. 16–31 determined by comparison with record of flow at station on Summit Creek.

Monthly discharge of Peteetneet Creek near Payson, Utah, for the year ending Sept. 30, 1915.

Month.	Discharge in second-feet.			Run-off (total in acre-feet).
	Maximum.	Minimum.	Mean.	
October	8.7	6.3	7.5	461
November	7.7	6.1	6.8	405
December	8.4	6.6	7.4	455
January	7.5	4.3	6.7	412
February	6.8	5.3	5.9	328
March	6.8	4.8	6.0	369
April	93.0	7.2	37.1	2,208
May	39.0	23.4	31.5	1,937
June	29.7	11.0	19.8	1,178
July	12.4	9.4	10.2	627
August	10.0	8.4	9.4	578
September	10.0	6.3	8.3	494
The year	93.0	4.3	13.1	9,452

SPANISH FORK AT THISTLE, UTAH.

LOCATION.—In the SW. ¼ SW. ¼ sec. 28, T. 9 S., R. 4 E., in the town of Thistle, Utah County, about 800 feet below point at which Soldier Fork and Thistle Creek unite to form Spanish Fork, and 3 miles above Diamond Fork.

DRAINAGE AREA.—490 square miles.

RECORDS AVAILABLE.—December 3, 1907, to September 30, 1915.

GAGE.—Inclined staff on right bank 10 feet below cable. Used May 4 to September 30, 1915; read daily by Mrs. Effie Gordon. November 21, 1912, to May 3, 1915, a vertical staff on right bank at same site and datum. December 3, 1907, to November 20, 1912, a vertical staff on left bank about a mile downstream.

Discharge measurements.—Made from cable at gage or by wading at various sections.

Channel and control.—Bed composed of gravel and sand. Control a gravel bar about 30 feet below gage; shifts. One channel at all stages. Left bank low and subject to overflow; right bank high and partly wooded. Channel straight for 100 feet above and 600 feet below gage.

Extremes of discharge.—Maximum stage recorded during year, 4.98 feet May 3 (discharge, 320 second-feet); minimum stage, 3.79 feet August 27 (discharge, 19.7 second-feet).

1907–1915: Maximum discharge recorded, 920 second-feet May 10, 1914; minimum discharge, 18.5 second-feet December 20, 1913.

Winter flow.—Stage-discharge relation affected by ice for short periods.

Diversions.—No important diversions above station.

Regulation.—None.

Cooperation.—Records since January 1, 1911, furnished by United States Reclamation Service.

Discharge measurements of Spanish Fork at Thistle, Utah, during the year ending Sept. 30, 1915.

Date.	Made by—	Gage height.	Discharge.	Date.	Made by—	Gage height.	Discharge.
		Feet.	*Sec.-ft.*			*Feet.*	*Sec.-ft.*
Oct. 14	B. M. Hall, jr	3.82	75	May 3	R. M. Adams	4.66	203
Jan. 19	do	[a] 4.16	56	19	do	4.53	170
Feb. 19	do	4.03	59	June 7	do	4.39	161
Mar. 17	do	4.08	70	29	do	4.13	77
30	do	4.19	88	July 19	do	3.93	38.0
Apr. 16	do	4.47	162	31	do	3.90	37.0
23	Adams and Hall	4.68	208	Aug. 28	do	3.84	27.4

[a] Stage-discharge relation affected by ice.

Daily discharge, in second-feet, of Spanish Fork at Thistle, Utah, for the year ending Sept. 30, 1915.

Day.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.
1	84.0	76.0	57.0	93.3	52.0	56.0	85.9	237.0	148.0	67.6	30.0	26.1
2	84.0	76.0	57.0	81.8	52.0	56.0	91.0	237.0	148.0	71.6	31.4	38.9
3	109.0	76.0	63.2	81.8	52.0	56.0	121.0	320.0	146.0	75.6	32.7	61.8
4	72.8	76.0	68.0	93.3	52.0	52.1	111.7	193.0	156.0	79.8	32.7	43.7
5	72.8	76.0	68.0	116.4	48.6	52.1	116.4	193.0	186.0	59.8	32.7	35.6
6	72.8	74.4	63.2	104.8	52.0	52.1	105.0	150.0	163.0	61.8	37.2	35.6
7	76.0	74.4	63.2	93.3	61.8	56.0	111.7	150.0	160.0	61.8	34.0	32.7
8	100.5	68.0	57.0	93.3	67.6	61.8	121.0	136.0	153.0	63.7	30.0	32.7
9	100.5	68.0	52.0	93.3	61.8	61.8	116.4	136.0	143.0	61.8	28.7	30.0
10	84.0	68.0	57.0	93.3	52.0	61.8	111.7	136.0	136.0	57.9	28.7	31.4
11	84.0	68.0	63.2	93.3	56.0	61.8	116.4	138.0	133.0	57.9	28.7	35.6
12	76.0	68.0	68.0	88.0	61.8	61.8	121.0	136.0	131.0	57.9	26.1	38.9
13	76.0	69.6	55.0	81.8	67.6	71.6	140.0	140.0	128.0	54.1	20.8	34.0
14	79.2	69.6	57.0	81.8	61.8	61.8	146.0	140.0	119.0	54.1	20.8	35.6
15	76.0	72.8	50.0	81.8	56.0	71.6	153.0	140.0	107.0	48.6	22.1	35.6
16	76.0	72.8	50.0	81.8	52.1	75.6	153.0	140.0	97.9	45.3	38.9	34.0
17	76.0	63.2	50.0	81.8	52.1	75.6	160.0	138.0	93.3	45.3	28.7	38.9
18	76.0	60.0	60.0	75.6	52.1	81.8	178.0	148.0	93.3	35.6	27.4	38.9
19	76.0	55.0	70.0	75.6	56.0	75.6	190.0	138.0	88.0	35.6	27.4	37.2
20	76.0	55.0	65.0	75.6	56.0	81.8	243.0	158.0	85.9	35.6	24.8	38.9
21	76.0	55.0	70.0	75.6	56.0	67.6	243.0	168.0	81.8	35.6	24.8	37.2
22	76.0	58.0	70.0	93.3	56.0	111.7	216.0	156.0	79.8	35.6	24.8	35.6
23	76.0	60.0	70.0	111.7	61.8	111.7	237.0	140.0	73.6	35.6	26.1	35.6
24	76.0	60.0	70.0	140.0	52.1	116.4	211.0	143.0	73.6	71.6	27.4	34.0
25	76.0	60.0	75.0	166.0	54.1	116.4	166.0	166.0	69.5	43.7	28.7	42.1
26	76.0	60.0	75.0	166.0	52.1	111.7	166.0	170.0	67.6	38.9	24.8	46.9
27	76.0	60.0	60.0	116.4	52.1	116.4	211.0	160.0	73.6	38.9	19.7	42.1
28	76.0	68.0	60.0	52.0	56.0	111.7	230.0	160.0	73.6	35.6	22.1	42.1
29	76.0	68.0	60.0	52.0	......	121.0	230.0	160.0	71.6	28.7	22.1	42.1
30	76.0	58.0	60.0	56.0	......	85.9	243.0	153.0	71.6	28.7	22.1	42.1
31	76.0	......	65.0	56.0	......	93.3	......	148.0	......	30.0	26.1	......

Monthly discharge of Spanish Fork at Thistle, Utah, for the year ending Sept. 30, 1915.

Month.	Discharge in second-feet.			Run-off (total in acre-feet).
	Maximum.	Minimum.	Mean.	
October	109.0	72.8	79.5	4,888
November	76.0	55.0	66.5	3,957
December	75.0	50.0	62.2	3,824
January	166.0	52.0	91.8	5,645
February	67.6	48.6	55.8	3,099
March	121.0	52.1	79.0	4,858
April	243.0	85.9	161.5	9,610
May	320.0	136.0	162.2	9,973
June	186.0	67.6	111.7	6,646
July	79.8	28.7	50.1	3,075
August	37.2	19.7	27.5	1,691
September	61.8	26.1	37.9	2,314
The year	320.0	19.7	82.1	59,580

SPANISH FORK NEAR SPANISH FORK, UTAH.

LOCATION.—In the SW. ¼ SW. ¼ sec. 2, T. 9 S., R. 3 E., about half a mile below the United States Reclamation Service diversion dam of the Strawberry Valley project, and half a mile above intake of East Bench canal, 5 miles southeast of town of Spanish Fork, Utah County.

DRAINAGE AREA.—670 square miles.

RECORDS AVAILABLE.—May 23, 1900, to November 30, 1901; March 26, 1903, to September 30, 1915.

GAGE.—Inclined staff on right bank, half a mile below United States Reclamation Service diversion dam January 1, 1913, to September 30, 1915; original gage inclined staff on right bank about 600 feet above East Bench canal heading, May 23, 1900, to November 30, 1901, and March 26, 1903, to July 31, 1912; temporary gage one-fourth mile above original gage, August 1 to December 31, 1912.

DISCHARGE MEASUREMENTS.—Made from cable at gage or by wading.

CHANNEL AND CONTROL.—Bed composed of gravel and rocks; one channel at all stages; straight for about 200 feet above and 150 feet below gage. Banks high and may cave off during floods. Water is turbulent and control generally shifts during high water.

EXTREMES OF DISCHARGE.—Maximum stage recorded during year, 5.88 feet April 30 (discharge, 283 second-feet); minimum stage, 3.9 feet August 31 and September 1 (discharge, 16.0 second-feet).

1900–1915: Maximum stage recorded, 6.0 feet May 21, 1907 (discharge, 1,970 second-feet); minimum stage, river dry at several different times when entire flow was being diverted at Reclamation Service dam.

WINTER FLOW.—Stage-discharge relation affected by ice at times; flow determined from the records of Diamond Fork and Spanish Fork near Thistle.

DIVERSIONS.—Above all important diversions except the United States Reclamation Service power canal which supplies the high-line canal, the power plant, and the Salem Canal; water can also be returned to the river at the power plant. In 1915 this canal diverted about 46,000 acre-feet.

The Strawberry reservoir (present capacity about 250,000 acre-feet) has been constructed to store the waters of Strawberry River, a stream in the Colorado River basin; this water can be diverted to the Spanish Fork basin by means of a tunnel.

Regulation.—Natural flow affected by diversion by the United States Reclamation Service half a mile above station, and will also be affected whenever water is supplied from the Strawberry Valley reservoir.

Cooperation.—Since January 1, 1911, records have been furnished by the United States Reclamation Service.

Discharge measurements of Spanish Fork near Spanish Fork, Utah, during the year ending Sept. 30, 1915.

Date.	Made by—	Gage height.	Discharge.	Date.	Made by—	Gage height.	Discharge.
		Feet.	*Sec.-ft.*			*Feet.*	*Sec.-ft.*
Oct. 13	B. M. Hall, jr.	4.16	52.0	May 21	R. M. Adams	5.43	226
Jan. 22	.....do	4.02	22.6	June 16	.....do	4.84	100
Feb. 16	.....do	4.23	36.7	29	.....do	4.90	111
Mar. 15	.....do	4.26	45.1	July 7	.....do	5.00	125
30	.....do	4.53	87	19	.....do	4.93	116
Apr. 9	.....do	4.64	114	22	.....do	4.65	77
16	.....do	5.06	155	Aug. 1	.....do	4.20	27.6
22	.....do	5.60	242	30	.....do	4.10	17.8
May 7	R. M. Adams	5.28	197	Sept. 29	.....do	4.16	21.4

Daily discharge, in second feet, of Spanish Fork near Spanish Fork, Utah, for the year ending Sept. 30, 1915.

Day.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.
1	50.0	46.8	35.0	67.0	23.7	35.0	79.1	265.0	167.6	106.9	72.5	16.0
2	50.0	46.8	34.3	54.0	25.5	34.1	81.7	248.0	163.2	118.0	72.5	19.5
3	90.2	46.8	43.6	55.0	27.4	34.1	97.0	235.0	157.4	116.6	72.5	45.1
4	57.2	46.8	42.8	55.0	25.5	30.2	101.2	223.5	185.5	121.2	70.0	48.5
5	53.6	46.8	42.0	68.0	17.4	37.0	99.8	213.0	200.5	120.8	70.0	39.5
6	53.6	46.0	43.6	77.0	18.2	35.0	99.8	200.5	178.0	119.4	72.5	37.3
7	53.6	46.8	42.0	68.0	20.1	31.2	97.0	190.0	166.1	122.6	75.0	31.0
8	70.0	45.2	37.8	67.0	23.7	35.0	116.6	184.0	125.0	137.0	72.5	25.0
9	80.0	42.0	27.5	65.0	27.7	34.1	101.2	182.5	116.6	135.5	70.0	25.0
10	61.7	45.2	32.2	67.0	29.3	36.0	97.0	184.0	106.9	132.5	63.8	22.2
11	58.1	43.6	38.5	72.0	30.0	38.0	99.8	191.5	102.9	134.0	62.5	21.8
12	57.2	41.3	40.6	61.0	37.0	193.0	102.6	193.0	97.5	126.5	62.5	26.9
13	55.4	43.6	43.6	57.0	31.2	44.0	112.4	193.0	96.2	131.0	56.6	21.3
14	54.5	45.2	28.7	55.0	29.3	43.0	122.2	191.5	93.8	125.0	54.2	26.0
15	53.6	37.8	28.3	55.0	27.4	47.4	120.8	191.5	85.0	122.6	54.2	26.9
16	52.7	37.8	27.9	55.0	31.2	53.4	145.0	188.5	104.2	119.4	58.9	27.9
17	52.7	40.6	27.5	60.0	33.0	51.0	144.3	188.5	92.5	119.4	62.5	26.9
18	52.7	35.7	30.8	59.0	33.0	57.0	154.5	202.0	87.5	116.6	61.2	26.9
19	50.0	33.6	32.2	48.0	31.2	51.0	193.0	202.0	93.8	111.0	62.5	29.0
20	48.4	33.6	28.0	49.0	30.0	53.4	239.5	203.5	91.2	109.6	60.0	26.9
21	48.4	35.0	28.7	41.0	31.2	54.6	239.5	216.0	90.0	109.6	60.0	24.1
22	48.4	32.9	29.4	68.0	32.1	58.8	241.0	191.5	83.7	112.4	58.9	22.2
23	47.6	35.0	31.5	89.0	31.2	75.2	223.5	185.5	77.5	111.0	60.0	20.4
24	47.6	33.6	34.0	96.0	32.1	84.4	220.5	184.0	75.0	111.0	33.1	16.8
25	47.6	39.9	36.4	135.0	34.1	106.2	220.5	188.5	71.3	113.8	29.0	25.0
26	47.6	39.2	28.0	135.0	35.0	99.8	220.5	197.5	76.2	113.8	32.1	25.0
27	48.4	39.2	26.0	85.0	31.2	112.4	217.5	185.5	111.0	119.4	29.0	25.0
28	48.4	42.0	28.0	32.0	16.5	97.0	223.5	184.0	115.2	108.3	29.0	23.2
29	48.4	43.6	29.4	20.0	....	111.0	245.0	179.5	111.0	90.0	29.0	23.2
30	47.6	39.2	29.4	28.0	....	83.0	283.0	176.5	112.4	82.5	23.2	21.3
31	47.6	....	29.4	27.0	....	83.0	....	169.0	....	82.5	16.0	....

Monthly discharge of Spanish Fork near Spanish Fork, Utah, for the year ending Sept. 30, 1915.

Month.	Discharge in second-feet.			Run-off (total in acre-feet).
	Maximum.	Minimum.	Mean.	
October	90.2	47.6	54.3	3,339
November	46.8	32.9	41.1	2,446
December	43.6	26.0	33.5	2,060
January	135.0	20.0	63.6	3,909
February	39.0	16.5	29.0	1,611
March	193.0	30.2	62.5	3,843
April	283.0	79.1	158.0	9,402
May	265.0	169.0	197.7	12,156
June	200.5	71.3	114.5	6,813
July	137.0	82.5	116.1	7,139
August	75.0	16.0	55.0	3,383
September	48.5	16.0	26.5	1,577
The year	283.0	16.0	79.7	57,678

SPANISH FORK AT LAKE SHORE, UTAH.

LOCATION.—In the NE. ¼ sec. 15, T. 8 S., R. 2 E., about a mile east of Lake Shore, 3 miles above the mouth, and about 3 miles northwest of Spanish Fork, Utah County; below all tributaries and diversions.

DRAINAGE AREA.—700 square miles.

RECORDS AVAILABLE.—December 10, 1903, to July 10, 1907; March 10, 1909, to September 30, 1915.

GAGE.—Inclined staff with vertical low-water extension, on right bank about half a mile below highway bridge March 10, 1909, to September 30, 1915; original gage vertical staff on left bank immediately below bridge December 10, 1903, to May 25, 1904; gage at old cable 800 feet above bridge May 26, 1904, to July 10, 1907.

DISCHARGE MEASUREMENTS.—Made from cable at present gage or by wading.

CHANNEL AND CONTROL.—Bed soft; fairly permanent. One channel at all stages; banks of earth, high and clean.

EXTREMES OF DISCHARGE.—Maximum stage recorded during year, 6.95 feet April 22 (discharge, 336 second-feet); minimum stage, 1.70 feet August 16 to September 2 and September 6–24 (discharge, 2.2 second-feet).

1903–1915: Maximum stage recorded, 16.0 feet May 11, 1909 (discharge, 1,430 second-feet); minimum stage recorded, 0.95 foot August 6, 1909 (discharge, 2.5 second-feet); minimum discharge recorded, 0.9 second-foot July 26 to August 31, 1911 (stage, 1.15 feet).

WINTER FLOW.—Stage discharge relation affected by ice for short periods.

DIVERSIONS.—Entire flow is diverted above station during last part of irrigation season; only waste and return waters pass the gage at that time.

REGULATION.—Natural flow affected by the diversions above station.

COOPERATION.—Since January 1, 1911, records have been furnished by the United States Reclamation Service.

Discharge measurements of Spanish Fork at Lake Shore, Utah, during the year ending Sept. 30, 1915.

Date.	Made by—	Gage height.	Discharge.	Date.	Made by—	Gage height.	Discharge.
		Feet.	*Sec.-ft.*			*Feet.*	*Sec.-ft.*
Mar. 3	Quinn and Hall	4.20	111	Apr. 22	B. M. Hall, jr	6.80	313
Apr. 3	B. M. Hall, jr	4.90	161	May 5	R. M. Adams	3.32	68
17	do	6.00	254	11	do	1.74	2

Daily discharge, in second-feet, of Spanish Fork at Lake Shore, Utah, for the year ending Sept. 30, 1915.

Day.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.
1	3.0	129.0	97.0	82.0	107.0	114.0	149.0	149.0	19.2	3.0	3.0	2.2
2	3.0	128.0	97.0	88.3	110.0	116.0	149.0	146.0	19.2	3.0	3.0	2.2
3	7.2	126.5	100.0	94.7	114.0	118.0	156.0	142.0	21.1	3.0	3.0	4.1
4	11.5	125.0	103.0	101.0	98.0	120.0	163.0	85.0	23.0	3.0	3.0	6.0
5	10.0	122.0	104.0	99.5	82.0	121.0	170.0	88.0	33.7	3.0	3.0	4.1
6	8.5	119.0	105.0	98.0	87.3	121.0	182.0	76.0	44.3	3.0	3.0	2.2
7	7.0	123.0	106.0	98.0	93.0	121.0	193.0	71.0	55.0	3.0	3.0	2.2
8	81.5	127.0	104.5	98.0	98.0	121.0	221.0	31.0	47.5	3.0	3.0	2.2
9	156.0	131.0	103.0	96.7	102.5	122.0	193.0	15.0	40.0	3.0	3.0	2.2
10	145.7	125.0	103.0	95.3	107.0	124.0	193.0	12.0	23.0	2.9	3.0	2.2
11	135.4	119.0	103.0	94.0	135.0	124.0	193.0	4.3	6.0	2.7	3.0	2.2
12	125.0	108.0	101.0	95.5	163.0	124.0	193.0	4.3	5.0	2.6	3.0	2.2
13	123.5	97.0	99.0	107.0	139.0	127.7	209.0	4.3	4.0	2.6	3.0	2.2
14	122.0	96.0	97.0	105.5	115.0	131.4	225.0	4.3	3.0	2.6	2.7	2.2
15	128.0	95.0	95.5	104.0	91.0	135.0	248.0	4.3	3.0	2.6	2.5	2.2
16	134.0	94.0	94.0	109.7	107.5	138.0	271.0	4.3	3.0	2.6	2.2	2.2
17	135.0	91.0	98.5	115.3	124.0	140.0	267.0	4.3	3.0	2.7	2.2	2.2
18	136.0	88.0	103.0	121.0	124.0	140.0	263.0	4.3	3.0	2.9	2.2	2.2
19	137.0	88.0	95.0	132.0	124.0	140.0	280.0	4.3	3.0	3.0	2.2	2.2
20	138.7	88.0	87.0	142.0	124.0	142.0	298.0	31.2	3.0	3.0	2.2	2.2
21	140.5	90.0	79.0	124.0	124.0	144.0	326.0	58.0	3.0	3.0	2.2	2.2
22	140.5	92.0	77.5	106.0	124.0	146.0	336.0	52.7	3.0	3.0	2.2	2.2
23	140.5	94.0	76.0	88.0	122.0	156.0	312.0	47.4	3.0	3.0	2.2	2.2
24	139.3	100.0	79.0	86.5	121.0	166.0	259.0	42.0	3.0	3.0	2.2	2.2
25	138.1	106.0	82.0	85.0	120.0	142.0	209.0	46.0	3.0	3.0	2.2	2.3
26	137.0	101.5	82.0	101.5	118.0	118.0	209.0	48.0	3.0	3.0	2.2	2.4
27	134.0	97.0	82.0	118.0	116.7	136.7	149.0	48.0	3.0	3.0	2.2	2.6
28	131.0	97.0	82.0	111.0	115.4	145.3	138.0	48.0	3.0	3.0	2.2	2.6
29	131.0	97.0	83.5	104.0	....	174.0	121.0	38.4	3.0	3.0	2.2	2.6
30	131.0	97.0	85.0	105.5	....	162.0	170.0	28.8	3.0	3.0	2.2	2.6
31	130.0	....	85.0	106.2	....	149.0	....	19.2	....	3.0	2.2	......

Monthly discharge of Spanish Fork at Lake Shore, Utah, for the year ending Sept. 30, 1915.

[Drainage area, 700 square miles.]

Month.	Discharge in second-feet.			Run-off (total in acre-feet).
	Maximum.	Minimum.	Mean.	
October	156.0	3.0	101.5	6,425
November	131.0	88.0	106.4	6,331
December	106.0	76.0	93.2	5,731
January	142.0	82.0	103.6	6,874
February	163.0	82.0	114.5	6,764
March	174.0	114.0	134.8	8,839
April	336.0	121.0	214.8	13,543
May	149.0	4.3	43.9	4,702
June	55.0	3.0	13.0	1,722
July	3.0	2.6	2.9	172
August	3.0	2.2	2.5	160
September	6.0	2.2	2.4	244
The year	336.0	2.2	77.7	61,507

DIAMOND FORK NEAR THISTLE, UTAH.

Location.—In the NE. ¼ SE. ¼ sec. 17, T. 9 S., R. 4 E., at footbridge about 200 yards above mouth, and 2½ miles below Thistle, Utah County.

Drainage area.—157 square miles.

Records available.—December 2, 1907, to September 30, 1915.

Gage.—Inclined staff on left bank about 5 feet above footbridge.

Discharge measurements.—Made from footbridge or by wading.

Channel and control.—Bed composed of small gravel; shifts. One channel at all stages; straight for 100 feet above and below gage. Banks covered with cottonwood trees; subject to overflow during extreme floods.

Extremes of discharge.—Maximum stage recorded during year, 3.90 feet July 17 (discharge, 124 second-feet); minimum stage, 2.80 feet December 25 (discharge, 9.0 second-feet).

1907–1915: Maximum stage recorded, 5.6 feet May 7, 1909 (discharge, 715 second-feet); maximum discharge, 735 second-feet May 9, 1909 (stage, 5.5 feet); minimum stage recorded, 2 feet August 27–30 (discharge, 20 second-feet); minimum discharge, 6 second-feet January 29, 1909 (stage, 2.8 feet).

Winter flow.—Stage-discharge relation affected by ice for short periods.

Diversions.—No diversions of importance above or below station.

Regulation.—Natural flow affected by any water supplied from the Strawberry Valley reservoir.

Cooperation.—Since January 1, 1911, all records have been furnished by the United States Reclamation Service.

During 1915 about 9,900 acre-feet were supplied from the Strawberry Valley reservoir.

Discharge measurements of Diamond Fork near Thistle, Utah, during the year ending Sept. 30, 1915.

Date.	Made by—	Gage height.	Discharge.	Date.	Made by—	Gage height.	Discharge.
		Feet.	*Sec.-ft.*			*Feet.*	*Sec.-ft.*
Oct. 14	B. M. Hall, r	3.21	31.6	June 21	R. M. Adams	3.35	49.0
Jan. 18	do	2.91	13.4	28	do	3.60	73
Feb. 19	do	3.09	26.8	29	do	3.60	73
Mar. 17	do	3.16	32.0	July 18	do	3.83	110
31	do	3.23	41.1	28	S. J. Anderson	3.79	103
Apr. 17	do	3.45	64	31	R. M. Adams	3.68	84
23	Adams and Hall	3.53	73	Aug. 18	do	3.58	69
May 3	R. M. Adams	3.52	75	27	do	3.57	70
19	do	3.49	62	31	do	3.55	65
June 7	do	3.45	58	Sept. 21	do	3.16	32.1

Daily discharge, in second-feet, of Diamond Fork near Thistle, Utah, for the year ending Sept. 30, 1915.

Day.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.
1	30.2	29.4	28.6	16.5	21.6	28.9	45.1	70.4	70.4	72.0	94.2	65.8
2	30.2	29.4	28.6	16.5	23.2	28.9	46.0	69.2	66.9	87.0	90.6	65.8
3	30.2	29.4	28.6	18.6	23.2	28.0	51.5	70.4	68.0	84.0	87.0	73.5
4	32.8	29.4	28.6	17.2	21.6	27.2	45.1	70.4	69.2	84.0	84.0	75.0
5	31.9	29.4	28.6	17.2	18.6	27.2	46.0	69.2	66.9	82.0	84.0	75.0
6	31.9	29.4	28.6	15.8	17.2	28.0	48.2	70.4	65.8	87.0	82.5	68.2
7	32.8	29.4	28.6	18.6	15.8	28.9	49.3	70.4	65.8	96.0	79.5	68.2
8	38.2	29.4	28.6	18.6	18.6	29.8	54.8	70.4	64.7	105.0	79.5	69.5
9	42.0	28.6	28.6	17.2	21.6	28.9	48.2	69.2	64.7	114.0	79.5	68.2
10	32.8	28.6	28.6	18.6	23.2	28.0	49.3	69.2	65.8	116.0	72.0	68.2
11	32.8	28.6	28.6	18.6	30.7	28.0	48.2	68.0	65.8	118.0	70.8	59.5
12	32.8	28.6	28.6	17.2	31.5	27.2	50.4	65.8	63.6	120.0	70.8	50.9
13	32.8	28.6	28.6	18.6	28.0	28.0	50.4	64.7	63.6	114.0	57.5	41.0
14	31.9	28.6	28.6	18.6	26.4	29.8	51.5	63.6	61.4	118.0	59.5	41.8
15	31.9	28.6	28.6	18.6	23.2	30.7	54.8	61.4	60.3	111.0	59.5	41.8
16	31.0	28.6	27.0	16.5	21.6	31.6	59.2	59.2	57.0	111.0	60.8	41.8
17	30.2	29.4	24.2	16.5	23.2	33.4	59.2	59.2	54.8	124.0	69.5	40.3
18	30.2	29.4	21.4	13.7	28.0	33.4	58.1	65.8	53.7	111.0	70.8	39.6
19	30.2	29.4	18.6	13.7	28.0	34.3	59.2	66.9	52.6	109.0	69.5	39.6
20	30.2	29.4	15.8	16.5	28.0	34.3	68.0	68.0	51.5	111.0	72.0	38.9
21	30.2	29.4	13.1	14.4	29.8	33.4	69.2	69.2	50.4	114.0	65.8	38.9
22	30.2	29.4	10.5	13.7	31.6	34.3	70.4	69.2	52.0	111.0	69.5	38.9
23	30.2	29.4	10.2	13.7	32.5	35.2	71.6	66.9	49.0	109.0	69.5	38.9
24	29.4	29.4	9.6	14.4	28.0	35.2	71.6	66.9	49.0	113.0	72.0	38.9
25	29.4	29.4	9.0	15.8	28.9	36.1	70.4	65.8	46.0	114.0	70.8	36.8
26	29.4	29.4	10.5	14.4	27.2	36.1	69.2	66.9	41.0	111.0	70.8	34.0
27	30.2	28.6	16.0	14.4	28.0	37.0	68.0	68.0	82.0	109.0	70.8	32.6
28	29.4	28.6	15.0	15.8	28.0	38.8	68.0	68.0	78.0	103.0	69.5	31.2
29	29.4	28.6	16.0	13.0	....	39.7	71.6	66.9	82.5	101.0	69.5	27.7
30	29.4	28.6	16.0	18.6	....	45.1	71.6	65.8	72.0	87.0	59.5	27.0
31	29.4	....	14.5	18.6	....	44.2	....	65.8	....	91.0	65.8	....

Monthly discharge of Diamond Fork near Thistle, Utah, for the year ending Sept. 30, 1915.

Month.	Discharge in second-feet.			Run-off (total in acre-feet).
	Maximum.	Minimum.	Mean.	
October	42.0	29.4	31.4	1,931
November	29.4	28.6	29.1	1,732
December	28.6	9.0	21.8	1,340
January	18.6	18.0	16.4	1,008
February	32.5	21.6	25.2	1,400
March	45.1	27.2	35.8	2,201
April	71.6	45.1	58.1	3,457
May	70.4	59.2	67.1	4,126
June	82.5	41.0	61.8	3,677
July	124.0	72.0	104.4	6,415
August	94.2	57.5	74.7	4,593
September	75.0	27.0	49.2	2,928
The year	124.0	9.0	47.6	34,800

UNITED STATES RECLAMATION SERVICE POWER CANAL NEAR SPANISH FORK, UTAH.

Location.—In the SW. ¼ SW. ¼ sec. 2, T. 9 S., R. 3 E., near mouth of canyon, half a mile below canal head gates and about 5 miles southeast of Spanish Fork.

Records available.—January 1, 1909, to September 30, 1915.

Gage.—Inclined staff on right bank graduated to tenths from zero to 5 feet.

Discharge measurements.—Made by wading or from footbridge at gage.

Channel and control.—Concrete lined section; bottom width 4.0 feet, side slopes 1:1, and maximum depth of water will be about 6 feet. Control not permanent owing to earth and rock slides below gage.

Extremes of discharge.—Maximum stage recorded during year, 2.89 feet September 3 (discharge, 101.3 second-feet); minimum stage, 1.87 feet June 29 (discharge, 40 second-feet).

1909–1915: Maximum stage recorded, 3.75 feet June 2, 1909 (discharge, 188 second-feet). Canal dry at times for cleaning and repairs.

Winter flow.—Stage-discharge relation is sometimes affected by ice.

Diversions.—None above station.

Regulation.—Flow controlled by head gates half a mile above gage.

Accuracy.—Records published as received from the Reclamation Service.

Cooperation.—Since January 1, 1911, all records have been furnished by the United States Reclamation Service.

This canal, which is designed for a capacity of 500 second-feet, diverts on the left bank of Spanish Fork in the SE. ¼ sec. 2, T. 9 S., R. 3 E. About 3 miles below the head is the forebay of the power plant. Here part of the water can be carried on in the High-line canal to irrigate lands at the south end of the project and the remainder used to supply the power plant or turned down the wasteway. The tailrace water and that going down the wasteway is used to supply the Salem canal or returned to the river.

Discharge measurements of United States Reclamation Service power canal near Spanish Fork, Utah, during the year ending Sept. 30, 1915.

Date.	Made by—	Gage height.	Discharge.	Date.	Made by—	Gage height.	Discharge.
		Feet.	*Sec.-ft.*			*Feet.*	*Sec.-ft.*
Oct. 13	B. M. Hall, jr	2.68	75	May 21	R. M. Adams	2.42	59
Dec. 10	....do	2.37	55	June 1	....do	2.35	53
Jan. 22	....do	2.36	56	16	....do	2.10	42.2
Feb. 16	....do	2.50	66	29	....do	2.06	40.0
Mar. 16	....do	2.63	76	July 7	....do	2.12	44.0
30	....do	2.62	73	19	....do	2.10	41.9
Apr. 9	....do	2.68	79	Aug. 1	....do	2.40	58
16	....do	2.84	87	24	....do	2.70	76
22	....do	2.18	48.2	30	....do	2.98	98
May 10	R. M. Adams	2.29	53	Sept. 29	....do	2.53	64

Daily discharge, in second-feet, of United States Reclamation Service power canal near Spanish Fork, Utah, for the year ending Sept. 30, 1915.

Day.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.
1	73.3	72.7	65.9	63.0	67.1	70.8	75.9	59.1	51.6	41.2	56.4	95.0
2	73.3	72.7	65.9	64.2	67.7	70.2	77.3	57.5	51.0	42.6	56.9	95.0
3	92.8	72.7	70.2	64.8	70.2	70.2	82.0	55.4	49.5	43.0	56.9	101.3
4	77.3	72.7	69.6	65.4	67.1	70.2	75.9	56.9	50.5	41.6	55.9	92.8
5	74.6	72.7	69.6	65.4	63.6	69.0	77.9	57.5	49.1	43.4	59.1	95.0
6	74.6	72.1	69.6	63.6	61.9	68.3	76.6	58.1	44.4	43.9	56.9	95.0
7	74.6	72.1	69.0	64.2	64.2	65.9	75.9	54.8	43.9	43.4	58.1	96.6
8	82.7	70.8	68.3	65.4	64.8	67.1	91.3	52.6	45.2	44.8	56.9	98.2
9	86.2	68.3	62.5	65.4	67.1	67.7	78.6	52.6	45.2	44.4	55.9	98.2
10	77.3	70.8	62.5	65.4	69.6	67.7	75.9	52.1	43.9	44.4	53.2	96.9
11	75.9	68.3	68.3	59.7	72.7	69.0	76.6	54.3	44.8	43.4	52.6	95.0
12	74.6	70.2	61.3	64.2	73.3	69.6	78.6	52.6	44.8	44.4	52.6	95.9
13	74.6	70.8	63.0	63.0	69.6	73.3	83.4	51.6	46.2	40.8	50.5	74.6
14	73.3	70.8	61.3	65.4	65.4	72.7	84.8	53.2	44.4	41.6	49.1	71.4
15	72.7	65.9	54.9	65.4	60.8	75.3	84.8	53.2	43.9	42.6	49.1	71.4
16	72.1	65.9	54.9	63.0	69.6	76.6	84.1	53.2	43.4	43.4	51.6	66.5
17	72.1	67.1	58.1	57.5	69.6	76.6	82.7	51.6	43.0	43.0	52.6	65.9
18	72.1	64.8	63.6	60.2	69.6	76.6	86.2	58.1	42.6	42.6	53.2	64.2
19	73.3	62.5	64.8	61.3	71.4	73.9	61.9	56.9	42.6	41.6	52.6	63.6
20	75.3	63.6	61.3	61.9	75.3	74.6	47.1	55.9	40.8	41.6	52.6	65.9
21	75.9	63.6	62.5	63.0	72.7	74.6	47.6	57.5	41.6	41.2	52.1	64.8
22	75.3	62.5	62.5	58.6	72.1	76.6	47.1	51.0	40.8	42.1	51.6	64.8
23	74.6	64.2	59.7	58.1	72.1	81.3	48.1	49.1	40.4	41.6	52.1	61.9
24	74.6	63.6	58.1	56.4	77.3	75.3	49.1	50.5	43.9	42.1	70.8	62.5
25	74.6	67.1	61.3	59.1	69.6	73.3	49.1	51.0	43.0	43.0	94.3	65.4
26	74.6	67.1	63.6	65.4	77.3	73.3	48.1	51.0	44.4	42.6	86.9	66.5
27	74.6	68.3	62.5	65.4	69.6	75.3	51.0	53.2	42.1	44.4	85.6	65.9
28	74.0	70.2	62.5	65.9	67.1	74.6	52.6	52.1	40.8	41.6	84.8	65.4
29	73.3	70.8	62.5	67.7	....	84.8	51.0	52.1	40.0	41.2	84.8	64.2
30	73.3	68.3	63.6	67.1	....	74.6	47.1	50.5	40.4	41.6	88.4	62.5
31	73.3	....	63.6	68.3	....	74.6	....	48.1	....	41.6	92.8	....

Monthly discharge of United States Reclamation Service power canal near Spanish Fork, Utah, for the year ending Sept. 30, 1915.

Month.	Discharge in second-feet.			Run-off (total in acre-feet).
	Maximum.	Minimum.	Mean.	
October	92.8	72.1	75.5	4,642
November	72.7	62.5	68.4	4,070
December	70.2	54.9	63.5	3,904
January	65.9	58.1	63.3	3,894
February	77.3	60.8	69.2	3,843
March	84.8	65.9	73.0	4,489
April	91.3	47.1	68.3	4,064
May	59.1	48.1	53.6	3,296
June	51.6	40.0	44.3	2,636
July	44.8	40.8	42.6	2,619
August	94.3	49.1	62.2	3,824
September	101.3	61.9	78.0	4,641
The year	101.3	40.0	63.4	45,922

HOBBLE CREEK NEAR SPRINGVILLE, UTAH.

Location.—In sec. 7, T. 8 S., R. 4 E., about 150 feet below Springville power plant, 1 mile above mouth of canyon, and 4 miles southeast of Springville, Utah County.

Drainage area.—120 square miles.

Records available.—March 23, 1904, to September 30, 1915.

Gage.—Vertical staff fastened to large tree on right bank, 75 feet below cable, June 1, 1909, to September 30, 1915; original gage, vertical staff about 1,000 feet below, installed March 23, 1904, washed out by flood April 2, 1907; temporary gage, vertical staff at same site as original gage, installed June 1, 1907, washed out by flood about May 1, 1909.

Discharge measurements.—Made from cable or by wading at gage.

Channel and control.—Bed composed of boulders and coarse gravel; fairly permanent. One channel at all stages; banks high and wooded.

Extremes of discharge.—Maximum stage recorded during year, 4.30 feet April 22 and 23 (discharge, 118.5 second-feet); minimum stage, 3.15 feet August 27 and September 23 (discharge, 21.2 second-feet).

1909–1915: Maximum discharge recorded, 820 second-feet May 6–8, 1909 (estimated from high-water marks); minimum discharge, 7 second-feet October 7 and 8 and December 10, 1905.

Winter flow.—Largely from springs; stage-discharge relation not seriously affected by ice.

Diversions.—The only diversion above station is the power canal, and this water is returned to the stream about 150 feet above gage.

Regulation.—Low-water flow may be somewhat affected by operation of power plant.

Cooperation.—Since January 1, 1911, all records have been furnished by the United States Reclamation Service.

Discharge measurements of Hobble Creek near Springville, Utah, during the year ending Sept. 30, 1915.

Date.	Made by—	Gage height.	Discharge.	Date.	Made by—	Gage height.	Discharge.
		Feet.	*Sec.-ft.*			*Feet.*	*Sec.-ft.*
Oct. 15	B. M. Hall, jr	3.35	28.3	Apr. 1	B. M. Hall, jr	3.53	36.6
Jan. 20	do	3.24	23.1	12	do	4.05	97
Feb. 17	do	3.32	25.7	19	do	4.20	105
Mar. 16	do	3.37	27.9	May 4	R. M. Adams	3.90	70
Apr. 1	do	3.53	36.0	June 18	do	3.50	35.4

Daily discharge, in second-feet, of Hobble Creek near Springville, Utah, for the year ending Sept. 30, 1915.

Day.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.
1	27.1	26.5	29.7	25.0	25.4	26.4	36.8	81.0	64.4	34.8	23.6	22.3
2	28.3	26.5	28.7	25.0	25.8	27.1	41.6	87.1	64.4	34.8	23.6	23.9
3	29.5	27.6	28.7	25.0	23.8	26.0	54.7	75.2	64.4	34.8	23.6	25.5
4	30.7	28.7	28.7	25.0	21.8	25.0	64.4	69.5	69.5	33.4	23.6	27.1
5	32.0	28.1	28.7	25.0	22.3	25.0	69.5	69.5	69.5	32.0	24.3	26.0
6	31.5	27.5	28.2	25.0	22.8	25.0	69.5	75.2	59.4	29.2	25.0	25.0
7	31.0	25.9	27.8	25.0	23.5	25.0	75.2	81.0	54.7	29.2	24.5	24.3
8	30.2	26.2	27.4	25.0	24.3	25.0	93.2	75.2	54.7	30.6	24.0	23.6
9	29.4	26.5	27.0	25.0	25.0	25.0	81.0	81.0	50.0	32.0	23.6	24.1
10	28.7	27.6	26.5	25.0	26.0	25.0	75.2	75.2	50.0	29.2	23.6	24.6
11	28.7	28.7	26.3	25.0	27.1	25.0	81.0	69.5	45.8	29.2	23.6	25.0
12	28.7	28.7	26.1	24.7	27.1	25.4	87.1	69.5	45.8	29.2	23.6	24.5
13	28.7	28.7	25.9	24.4	27.1	25.8	87.1	75.2	45.8	27.1	23.6	24.0
14	28.7	28.4	25.9	24.1	26.4	26.5	93.2	69.5	45.8	29.2	23.6	23.6
15	28.7	28.1	25.9	23.8	25.8	27.2	93.2	69.5	41.6	28.2	23.6	23.6
16	28.7	27.8	26.2	23.6	25.8	27.9	105.4	64.4	38.2	27.1	23.6	23.6
17	29.0	27.2	26.5	23.3	25.8	27.5	105.4	64.4	34.8	27.1	23.6	23.6
18	29.3	26.5	26.5	23.0	26.2	27.1	99.3	75.2	34.8	27.1	23.6	23.6
19	29.7	26.5	26.5	22.8	26.7	28.6	105.4	75.2	34.8	27.1	23.6	23.6
20	29.7	26.5	26.5	23.6	27.1	29.2	112.0	75.2	34.8	27.1	23.6	23.6
21	29.7	26.7	26.5	23.4	27.1	29.2	112.0	69.5	38.2	27.1	23.6	23.6
22	29.9	26.9	27.0	23.3	27.1	29.2	118.5	69.5	38.2	26.0	22.9	22.4
23	30.1	27.1	27.4	23.1	26.4	29.2	118.5	64.4	41.6	25.0	22.3	21.2
24	30.4	27.4	27.1	23.1	25.7	29.2	93.2	64.4	41.6	25.0	22.1	22.4
25	30.7	27.8	26.8	23.1	25.0	30.6	93.2	59.4	38.2	25.0	21.8	23.6
26	31.0	28.2	26.5	23.6	25.0	32.0	81.0	69.5	38.2	25.0	21.5	25.4
27	29.8	28.7	26.5	24.2	25.0	34.8	81.0	69.5	41.6	25.0	21.2	27.1
28	28.7	28.7	26.5	24.2	25.7	34.8	75.2	64.4	41.6	24.3	22.3	25.0
29	27.6	28.7	26.5	24.2	......	34.8	64.4	64.4	38.2	23.6	22.3	25.0
30	26.5	28.7	26.5	24.6	......	38.2	75.2	64.4	34.8	24.3	22.3	25.0
31	26.5	......	26.5	25.0	......	38.2	......	64.4	......	25.0	22.3	......

Monthly discharge of Hobble Creek near Springville, Utah, for the year ending Sept. 30, 1915.

Month.	Discharge in second-feet.			Run-off (total in acre-feet).
	Maximum.	Minimum.	Mean.	
October	32.0	26.5	29.3	1,802
November	28.7	25.9	27.6	1,642
December	28.7	25.9	27.0	1,660
January	25.0	22.0	24.2	1,488
February	27.1	21.8	25.5	1,414
March	38.2	25.0	28.5	1,755
April	118.5	36.8	85.0	5,043
May	87.1	59.4	73.0	4,487
June	69.5	34.8	46.5	2,768
July	34.8	23.6	28.6	1,731
August	25.0	21.2	24.0	1,475
September	27.1	21.2	24.2	1,440
The year	118.5	21.2	36.7	26,705

PROVO RIVER AT FORKS, UTAH.

Location.—In sec. 26, T. 5 S., R. 3 E., at Vivian Park, summer resort just above Forks, Utah County, about 200 feet above highway bridge, 600 feet above mouth of South Fork of Provo River, which enters on the left, about a mile below mouth of North Fork, entering on the right, a mile above the Utah Power & Light Co.'s diversion dam, and 12 miles up Provo Canyon from Provo, on the highway and railroad from Provo to Heber.

Drainage area.—600 square miles.

Records available.—November 17, 1911, to September 30, 1915; also at various points below the mouth of South Fork since 1890.

Gage.—Inclined staff on left bank 10 feet upstream from cable; read once daily by J. F. Carter.

Discharge measurements.—Made from cable or by wading.

Channel and control.—Bed composed of small gravel; shifts. One channel at all stages; banks fairly high and not subject to overflow; maximum depth of water, 1.7 feet at gage height 1 foot. Gage height of zero flow about —0.5 foot.

Extremes of discharge.—Maximum stage recorded during year, 2.20 feet at 9.30 a. m. June 2 (discharge, 714 second-feet); minimum stage, 0.64 feet at 9.30 a. m. September 1 (discharge, 155 second-feet).

1911–1915: Maximum stage recorded, 4.03 feet June 8, 1912 (discharge, 2,110 second-feet); minimum stage, 0.64 foot September 1, 1915 (discharge, 155 second-feet).

Winter flow.—Stage-discharge relation not seriously affected by ice; open-water rating curve used.

Diversions.—Station is below diversions for irrigation in Heber Valley and above those in the vicinity of Provo.

Regulation.—Flow is regulated to some extent by a number of small lakes near the headwaters which have been utilized as storage reservoirs.

Accuracy.—Records good.

Discharge measurements of Provo River at Forks, Utah, during the year ending Sept. 30, 1915.

Date.	Made by—	Gage height.	Discharge.	Date.	Made by—	Gage height.	Discharge.
		Feet.	*Sec.-ft.*			*Feet.*	*Sec.-ft.*
Oct. 31	J. J. Sanford	1.12	300	June 11	E. A. Porter	2.25	736
Feb. 16	Utah Power & Light Co.	.94	254	July 22	Utah Power & Light Co.	.78	237
Apr. 6	J. J. Sanford	1.32	379	Aug. 13	Lynn Crandall	.72	172
9	Utah Power & Light Co.	1.37	373	Sept. 25	Utah Power & Light Co.	.77	206
May 14	.....do	.62	175	30	T. F. Wentz[a]	.81	208

[a] Water commissioner Provo River.

Daily discharge, in second-feet, of Provo River at Forks, Utah, for the year ending Sept. 30, 1915.

Day.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.
1	236	298	262	244	257	267	384	528	438	255	175	155
2	236	298	267	252	257	267	341	484	714	255	175	164
3	284	298	284	265	262	267	260	419	685	252	180	175
4	298	298	298	265	249	267	380	360	516	255	178	187
5	298	284	298	265	232	273	391	298	588	255	178	185
6	298	284	298	267	224	267	367	242	528	255	175	178
7	284	284	298	262	257	267	374	226	548	252	178	168
8	284	284	298	267	257	260	387	219	508	252	173	164
9	394	284	270	267	257	262	384	194	508	250	170	164
10	328	284	244	262	262	260	347	187	528	250	168	192
11	412	298	270	267	262	265	354	180	693	248	173	205
12	394	284	270	267	284	265	354	175	714	245	170	210
13	394	284	232	265	270	270	360	170	548	245	168	196
14	377	284	232	267	244	270	384	170	528	245	168	194
15	313	284	229	267	242	298	408	219	430	242	168	192
16	319	284	224	252	249	313	441	222	430	242	168	187
17	325	284	216	219	257	313	449	265	419	240	168	187
18	328	284	244	219	284	328	449	412	460	235	173	187
19	328	270	244	209	262	328	492	363	438	240	168	187
20	328	270	222	209	267	328	500	322	438	235	166	189
21	328	270	226	222	267	344	528	328	430	232	164	187
22	328	270	224	199	267	360	548	290	362	235	164	192
23	328	270	222	199	267	394	516	270	330	230	166	187
24	328	270	216	212	267	430	488	239	308	220	168	187
25	298	265	206	232	265	449	500	254	301	220	168	201
26	298	262	212	236	265	508	457	301	250	215	168	228
27	298	257	236	249	267	508	468	278	280	210	168	226
28	298	254	242	249	265	508	488	257	270	195	166	212
29	298	262	254	257	....	508	520	257	260	185	168	210
30	298	265	257	257	....	488	630	334	262	180	168	210
31	298	....	257	262	....	449	....	374	....	178	168	....

Note.—Discharge determined from several fairly well defined rating curves applicable as follows: Oct. 1 to June 21, July 1–22, Aug. 4 to Sept. 9, and Sept. 12–30. Discharge June 22–30, July 23 to Aug. 2, and Sept. 10 and 11 determined by indirect method for shifting control.

Monthly discharge of Provo River at Forks, Utah, for the year ending Sept. 30, 1915.

Month.	Discharge in second-feet.			Run-off (total in acre-feet).	Accuracy.
	Maximum.	Minimum.	Mean.		
October	412	236	318	19,600	B.
November	298	254	279	16,600	B.
December	298	206	250	15,400	B.
January	267	199	246	15,100	B.
February	284	224	259	14,400	B.
March	508	260	341	21,000	B.
April	630	341	435	25,900	A.
May	528	170	285	17,500	A.
June	714	250	457	27,200	B.
July	255	178	234	14,400	B.
August	180	164	170	10,500	B.
September	228	155	190	11,300	B.
The year	714	155	288	209,000	

SOUTH FORK OF PROVO RIVER AT FORKS, UTAH.

Location.—In sec. 26, T. 5 S., R. 3 E., at Vivian Park summer resort, just above Forks, Utah County, about a quarter of a mile above confluence of South Fork with Provo River, and 12 miles up Provo Canyon from Provo on highway and railroad from Provo to Heber.

Drainage area.—30 square miles.

Records available.—November 17, 1911, to September 30, 1915.

Gage.—Vertical staff nailed to cottonwood tree on right bank, June 15, 1913, to September 30, 1915; read once daily by J. F. Carter. Datum raised 2 feet on June 12, 1915. Original gage, vertical staff about 150 feet above mouth of stream, November 17, 1911, to June 14, 1913.

Discharge measurements.—Made from foot log near gage or by wading.

Channel and control.—Bed composed of gravel; shifting, but stage-discharge relation remained fairly permanent during 1915. One channel at all stages; banks high and not subject to overflow.

Extremes of discharge.—Maximum stage recorded during year, 2.70 feet at 9.30 a. m. October 4, December 4 and 6 (discharge, 44 second-feet); minimum stage, 2.42 feet at 9.30 a. m. May 16 (discharge, 22 second-feet).

1911–1915: Maximum stage recorded, 4.05 feet June 10, 1912 (discharge, 74 second-feet); minimum stage, 2.42 feet May 16, 1915 (discharge, 22 second-feet).

Winter flow.—Stage-discharge relation not affected by ice. Open-channel rating curve used.

Diversions.—Below all diversions.

Regulation.—None.

Accuracy.—Gage is difficult to read owing to rough water. Records fair.

Discharge measurements of South Fork of Provo River at Forks, Utah, during the year ending Sept. 30, 1915.

Date.	Made by—	Gage height.	Discharge.	Date.	Made by—	Gage height.	Discharge.
		Feet.	*Sec.-ft.*			*Feet.*	*Sec.-ft.*
Oct. 31	J. J. Sanford	2.72	46.1	June 22	E. A. Porter	2.53	33.3
Feb. 16	Employees of Utah Power & Light Co.	2.56	32.7	July 22	Employees of Utah Power & Light Co.	.46	24.7
Apr. 6	J. J. Sanford	2.58	36.5	Aug. 13	Lynn Crandall	.56	31.2
9	Employees of Utah Power & Light Co.	2.58	30.4	Sept. 25	Employees of Utah Power & Light Co.	.56	29.2
May 14	do	2.49	26.1	30	T. F. Wentz[a]	.58	35.6

[a] Water commissioner Provo River.

Daily discharge, in second-feet, of South Fork of Provo River, at Forks, Utah, for the year ending Sept. 30, 1915.

Day.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.
1	38	40	40	34	35	33	34	36	28	28	29	33
2	38	40	43	34	35	33	34	36	30	28	28	34
3	42	40	41	38	35	33	34	36	30	28	28	39
4	44	40	44	36	35	33	34	34	25	28	31	36
5	39	40	43	35	34	33	36	34	28	27	30	34
6	39	40	44	35	34	33	39	33	28	28	30	34
7	38	40	43	36	34	33	42	33	28	24	28	34
8	38	40	42	36	35	33	42	33	32	28	30	34
9	42	40	40	36	34	33	38	33	34	27	28	34
10	40	40	40	35	32	33	42	33	34	27	30	36
11	42	40	40	36	32	34	42	29	30	27	30	36
12	42	40	40	36	30	34	42	29	30	24	30	36
13	42	40	40	36	30	34	34	28	30	28	31	34
14	40	40	38	37	33	34	33	28	28	28	34	34
15	38	40	38	36	33	34	34	27	28	28	34	34
16	39	40	38	36	33	34	35	22	27	27	33	36
17	41	40	37	36	33	34	34	27	28	27	28	36
18	40	40	38	36	33	34	34	28	28	28	34	36
19	40	40	38	36	33	34	34	30	27	28	31	36
20	40	40	35	36	33	34	36	32	27	28	31	34
21	40	40	36	35	33	34	37	28	30	27	24	34
22	40	40	36	34	33	34	36	28	31	26	24	36
23	40	40	38	34	33	34	35	28	31	27	27	31
24	40	40	36	36	33	34	34	29	27	28	27	33
25	40	40	36	36	33	34	34	30	24	27	27	33
26	40	40	36	36	33	34	34	32	23	27	33	35
27	40	40	34	34	33	34	34	32	30	30	33	31
28	40	40	34	34	33	34	35	32	30	27	33	31
29	40	40	34	35	......	36	36	32	30	36	31	34
30	40	40	34	35	......	36	36	32	28	28	33	34
31	43	......	35	35	......	36	......	32	......	28	36	......

NOTE.—Discharge determined from a fairly well defined rating curve.

Monthly discharge of South Fork of Provo River at Forks, Utah, for the year ending Sept. 30, 1915.

Month.	Discharge in second-feet.			Run-off (total in acre-feet).	Accuracy.
	Maximum.	Minimum.	Mean.		
October	44	38	40.2	2,470	B.
November	40	40	40.0	2,380	B.
December	44	34	38.4	2,360	B.
January	38	34	35.5	2,180	B.
February	35	30	33.2	1,840	B.
March	36	33	33.9	2,080	B.
April	42	33	36.1	2,150	B.
May	36	22	30.8	1,890	B.
June	34	23	28.8	1,710	B.
July	36	24	27.6	1,700	B.
August	36	24	30.2	1,860	B.
September	39	31	34.4	2,050	B.
The year	44	22	34.1	24,700	

AMERICAN FORK NEAR AMERICAN FORK, UTAH.

LOCATION.—In sec. 30, T. 4 S., R. 3 E., at the ranger station about 50 feet above mouth of South Fork, 3 miles above the Utah Power & Light Co.'s American Fork plant No. 2, 4½ miles above plant No. 1 at mouth of canyon, and 11½ miles from town of American Fork, Utah County.

DRAINAGE AREA.—Approximately 43 square miles.

RECORDS AVAILABLE.—February 15, 1912, to September 30, 1915 (fragmentary).

GAGE.—Inclined staff on left bank 50 feet above mouth of South Fork; read occasionally by forest ranger.

Discharge measurements.—Made from bridge just below mouth of South Fork or by wading.

Channel and control.—Bed rocky; permanent except during floods. One channel at all stages. Gage height of zero flow about 1.2 feet.

Extremes of discharge.—Records too incomplete to be of value in determining extremes of stage or discharge.

Winter flow.—Stage-discharge relation not seriously affected by ice. Minimum flow probably occurs during winter.

Diversions.—Above all diversions.

Regulation.—None.

Daily discharge not determined, as no current-meter measurements were made during the year.

Daily gage height, in feet, of American Fork near American Fork, Utah, for the year ending Sept. 30, 1915.

Day.	Oct.	Nov.	Dec.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.
1	1.90									1.79
2	1.90									
3	2.28					2.30	2.40			
4							2.38		1.96	1.84
5							2.36		1.96	
6	1.92							2.20	1.95	
7	1.94								1.93	1.84
8	1.96						2.48		1.92	1.83
9	1.96							2.16		1.83
10	1.96									
11	1.96					2.40	2.60		1.90	2.20
12						2.40	2.48			1.96
13							2.42		1.88	1.88
14						2.60			1.87	1.88
15	1.98									1.86
16	1.98							2.08	1.90	
17		1.84						2.06		
18										
19		1.84	1.80					2.00	1.84	
20				1.78				2.02	1.83	
21						2.34		2.00	1.82	
22						2.30			1.82	
23							2.50		1.82	
24							2.60	1.98		
25							2.40	1.98	1.82	
26										
27	1.90							1.98		
28	1.90							1.97		
29								2.00		
30										
31										

SOUTH FORK OF AMERICAN FORK NEAR AMERICAN FORK, UTAH.

Location.—In sec. 30, T. 4 S., R. 3 E., at the ranger station about 150 feet above confluence with American Fork, 3 miles above Utah Power & Light Co.'s American Fork plant No. 2, 4½ miles above plant No. 1 at mouth of canyon, and 11½ miles from town of American Fork, Utah County.

Drainage area.—About 5.8 square miles.

Records available.—February 15, 1912, to September 30, 1915 (fragmentary).

Gage.—Vertical staff on right bank; read occasionally by forest ranger.

Discharge measurements.—Made from bridge near gage or by wading.

Channel and control.—Bed composed of course, clean gravel; fairly permanent. One channel at all stages.

Extremes of discharge.—Data insufficient to determine extremes of flow. Minimum flow probably occurs during winter.

Winter flow.—Stage-discharge relation not seriously affected by ice. Flow very low when stream freezes near its source.

Diversions.—None.

Regulation.—None.

Daily discharge not determined, as no current-meter measurements were made during year.

Daily gage height, in feet, of South Fork of American Fork near American Fork, Utah, for the year ending Sept. 30, 1915.

Day.	Oct.	Nov.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.
1	0.60								0.62
2	.60								
3	.76				0.82	0.94			
4						.92		0.70	.62
5						.96		.70	
6	.60						0.98	.70	
7	.60							.68	.62
8	.60					.96		.67	.61
9	.60						.90		.60
10	.60								
11	.60				.82	1.30		.67	.64
12					.80	1.30			.62
13						1.08		.67	.64
14					.86			.66	.62
15	.60								.60
16	.60						.80	76	
17		0.52					.78		
18									
19		1.75					.76	.67	
20			0.45				.78	.66	
21					.92		.76	.65	
22					.90			.65	
23						1.14		.65	
24						1.20	.72		
25						1.12	.72	.64	
26									
27	.46						.72		
28	.46						.70		
29							.70		
30									
31									

SEVIER LAKE BASIN.

SEVIER RIVER AT HATCH, UTAH.

Location.—In the SE. ¼ sec. 28, T. 36 S., R. 5 W., at county bridge a quarter of a mile east of J. C. Barnhurst's house at Hatch, Garfield County, and 1½ miles below site of Hatchtown Dam, which was washed out in May, 1914.

Drainage area.—260 square miles (measured on topographic maps).

Records available.—June 3 to November 4, 1911; December 10, 1911, to September 30, 1915.

Gage.—Stevens water-stage recorder, 50 feet below bridge, August 23, 1914, to September 30, 1915; original gage, about one-eighth mile upstream, June 3 to November 4, 1911, and December 10, 1911, to May 7, 1912; vertical staff on middle pier of bridge, May 8, 1912, to May 6, 1914; Stevens water-stage recorder about 1½ miles above bridge, May 7 to May 25, 1914, when Hatchtown reservoir dam broke, releasing 11,600 acre-feet of stored water. This gage was reinstalled at site below bridge August 23, 1914.

Discharge measurements.—Made from bridge or by wading.

Channel and control.—Bed composed of sand and gravel; fairly permanent; one channel at all stages.

Extremes of discharge.—Maximum stage recorded during year, 3.00 feet at 8 a. m. June 2 (discharge, 770 second-feet); minimum stage, 0.62 foot March 10–16 (discharge, 79 second-feet).

1911-1915: Maximum stage recorded, 5.8 feet June 5, 1912 (discharge, 1,210 second-feet); minimum stage, 1.0 foot March 18 to April 2, 1912 (discharge, 10 second-feet).

WINTER FLOW.—Stage-discharge relation affected by ice for short periods.

DIVERSIONS.—Above all diversions except Hatch Bench canal and Panguitch Lake ditch, which divert a small quantity of water from Mammoth Creek. Hillsdale ditch diverts about 4 miles downstream, and several other canals about 7 miles below for irrigation in Panguitch Valley.

REGULATION.—Entire flow controlled by gates in Hatchtown reservoir dam before May 25, 1914.

ACCURACY.—Records good.

Discharge measurements of Sevier River, at Hatch, Utah, during the year ending Sept. 30, 1915.

[Made by J. J. Sanford.]

Date.	Gage height.	Discharge.	Date.	Gage height.	Discharge.	Date.	Gage height.	Discharge.
	Feet.	*Sec.-ft.*		*Feet.*	*Sec.-ft.*		*Feet.*	*Sec.-ft.*
Jan. 15	[a] 0.78	96	May 30	2.72	670	Aug. 24	.84	114
Mar. 15	.62	75	June 16	2.20	503	Sept. 24	.84	112
May 1	1.86	426	July 2	1.35	257			
18	2.84	723	28	1.08	169			

[a] Stage-discharge relation affected by ice.

Discharge, in second-feet, of Sevier River at Hatch, Utah, for the year ending Sept. 30, 1915.

Day.	Oct.	Nov.	Dec.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.
1	130	118	106	......	84	142	410	722	266	158	148
2	130	118	106	......	84	158	362	754	260	155	198
3	130	118	106	......	84	163	362	700	257	150	252
4	130	118	106	......	84	168	356	645	254	150	361
5	130	118	106	......	84	164	392	594	241	150	168
6	130	118	97	......	84	160	377	594	232	150	150
7	130	118	97	93	84	156	365	594	227	150	142
8	125	130	88	88	84	156	359	674	216	150	138
9	125	130	93	84	84	168	356	706	211	150	132
10	120	130	94	93	79	183	362	738	209	132	130
11	120	130	95	93	79	209	392	754	201	132	125
12	120	130	96	84	79	211	453	738	193	132	122
13	120	130	97	84	79	203	546	706	188	135	122
14	120	130	97	84	79	193	610	690	188	138	125
15	120	130	97	84	79	216	658	610	188	135	128
16	120	130	97	84	79	240	690	530	183	188	128
17	120	130	97	84	84	263	706	515	183	150	125
18	120	130	......	88	86	286	722	512	180	140	122
19	120	130	......	84	84	288	674	496	178	130	118
20	120	130	......	84	88	326	594	459	178	122	115
21	120	130	......	88	90	320	562	431	178	120	115
22	120	130	......	88	93	335	540	404	234	115	112
23	120	130	......	84	99	365	515	386	168	112	110
24	120	130	......	84	104	392	530	353	171	110	112
25	118	130	......	84	108	303	578	338	259	110	112
26	118	130	102	88	108	303	594	326	186	112	112
27	118	130	97	93	111	303	610	315	189	128	112
28	118	130	102	84	118	303	642	300	166	118	110
29	118	106	......	......	122	320	674	283	163	112	110
30	118	106	......	......	127	320	674	274	160	112	110
31	111	......	......	......	132	......	690	......	158	110	......

NOTE.—Discharge determined from two well-defined curves, applicable Oct. 1 to July 21 and July 23 to Sept. 30. Staff gage used Oct 1 to Mar. 16 and a few days when clock of water-stage recorder stopped. Discharge estimated because of ice Dec. 10-12, as in table; Dec. 18-25, and 29-31, 97 second-feet; Jan. 1-31, 96 second-feet; Feb. 1-6, 90 second-feet. Clock stopped, discharge determined from range of stage Apr. 3-6, 15-17, June 3-4, Sept. 17-19, 24-30.

Monthly discharge of Sevier River at Hatch, Utah, for the year ending Sept. 30, 1915.

Month.	Discharge in second-feet.			Run-off (total in acre-feet).	Accuracy.
	Maximum.	Minimum.	Mean.		
October	130	111	122	7,500	B.
November	130	106	126	7,500	C.
December	106	88	98.2	6,040	C.
January	......	......	[a] 96.0	5,900	C.
February	93	84	87.3	4,850	C.
March	132	79	92.4	5,680	B.
April	392	142	244	14,500	B.
May	722	356	528	32,500	B.
June	754	274	538	32,000	B.
July	266	158	202	12,400	B.
August	188	110	134	8,240	A.
September	361	110	139	8,270	B.
The year	754	79	201	145,000	

[a] Estimated.

SEVIER RIVER NEAR CIRCLEVILLE, UTAH.

Location.—Approximately in sec. 29, T. 31 S., R. 4 W., 2¼ miles above mouth of Pine Creek, and 8 miles southwest of Circleville, Piute County.

Drainage area.—950 square miles (measured on topographic maps).

Records available.—May 10 to September 19, 1912; April 23, 1914, to September 30, 1915.

Gage.—Stevens water-stage recorder, with outside and inside staff gages, about a mile below old gage, April 23, 1914, to September 30, 1915; vertical staff on bridge abutment during irrigation season of 1912; flow practically the same at both places.

Discharge measurements.—Made from cable or by wading.

Channel and control.—Bed composed of sand and rocks; fairly permanent. One channel at all stages.

Extremes of discharge.—Maximum stage recorded during year, 5.6 feet at 4.30 p. m. May 18 (discharge, 786 second-feet); minimum stage, 2.50 feet at 5 p. m. July 16 (discharge, 65 second-feet).

1912, 1914–15: Maximum stage recorded, 3.7 feet May 30, 1912 (discharge, 860 second-feet); minimum stage, 2.50 feet July 16, 1915 (discharge, 65 second-feet).

Winter flow.—Stage-discharge relation seriously affected by ice.

Diversions.—Above all diversions for Circle Valley; below several diversions for Hatchtown project and Panguitch Valley.

Regulation.—Flow was affected somewhat by operation of Hatchtown reservoir until the dam broke, May 25, 1914.

Accuracy.—Records good for periods in which gage was in operation; poor for other periods.

Discharge measurements of Sevier River near Circleville, Utah, during the year ending Sept. 30, 1915.

Date.		Made by—	Gage height.	Discharge.	Date.		Made by—	Gage height.	Discharge.
			Feet.	*Sec.-ft.*				*Feet.*	*Sec.-ft.*
Oct.	21	J. J. Sanford	3.12	127	June	15	J. J. Sanford	4.30	422
Dec.	5	....do	3.36	168	July	1	....do	2.94	129
Jan.	14	....do	3.20	148		14	Porter and Sanford	2.58	75
Mar.	18	....do	3.50	193		27	J. J. Sanford	3.62	253
May	4	....do	4.52	498	Aug.	10	....do	2.64	82
	17	....do	5.40	728		23	....do	2.72	88
	29	....do	4.98	603					

Daily discharge, in second-feet, of Sevier River near Circleville, Utah, for the year ending Sept. 30, 1915.

Day.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.
1	184	116	155	......	151	......	215	531	613	132	150	135
2	197	119	158	......	151	......	228	526	613	127	141	157
3	188	120	180	......	156	......	238	505	644	134	132	259
4	184	120	188	......	150	......	257	492	699	128	124	295
5	175	141	180	......	151	......	267	510	641	144	115	267
6	188	131	182	......	151	......	247	518	574	137	108	216
7	170	......	166	......	151	......	234	518	558	139	102	204
8	161	......	141	......	150	......	244	484	531	139	92	200
9	165	......	150	......	148	158	242	484	596	116	83	186
10	151	......	153	151	163	165	242	484	619	102	78	188
11	144	......	165	148	173	172	244	495	568	100	82	184
12	144	......	161	143	165	179	262	531	518	89	77	181
13	144	......	151	138	155	184	270	580	474	83	77	173
14	141	......	141	141	161	189	282	619	448	77	78	181
15	138	......	155	......	161	221	293	670	432	74	86	186
16	141	......	161	......	161	228	288	702	396	68	89	181
17	138	......	158	......	158	201	273	728	358	70	109	181
18	130	......	156	......	158	197	307	763	344	70	97	179
19	130	......	151	......	161	195	340	740	370	78	85	188
20	131	138	146	......	160	194	370	684	309	94	83	177
21	128	151	151	......	158	193	390	624	286	150	85	173
22	127	156	......	......	156	......	420	596	258	144	86	160
23	125	158	......	......	155	......	426	582	230	192	89	160
24	124	158	......	......	......	......	430	582	211	195	89	155
25	122	166	......	......	......	......	435	582	197	170	90	148
26	122	161	......	......	......	......	440	599	185	240	89	152
27	116	163	......	......	......	......	445	582	166	252	89	157
28	113	170	......	......	......	230	470	619	159	203	93	155
29	112	172	......	......	......	205	585	607	152	175	96	152
30	114	166	......	......	......	207	585	619	144	163	94	138
31	113	......	......	......	......	215	......	613	......	157	104	......

NOTE.—Discharge determined from four well-defined curves, applicable Oct. 1 to Apr. 18, Apr. 29 to July 22, July 27 to Sept. 2, and Sept. 6–30, respectively. Gage not working and discharge estimated Nov. 7–19, 135 second-feet; Mar. 19–20, as in table; and Mar. 22–27, 205 second-feet. Stream frozen and mean flow estimated Dec. 22 to Jan. 9, 150 second-feet; Jan. 15–31, 145 second-feet; Feb. 24–28, 156 second-feet; Mar. 1–8, 157 second-feet; estimates based on climatic data and comparison with record of flow of Sevier River at Kingston. Discharge estimated Apr. 19-28, July 23-26, and by indirect method for shifting control Sept. 3–5.

Monthly discharge of Sevier River near Circleville, Utah, for the year ending Sept. 30, 1915.

Month.	Discharge in second-feet.			Run-off (total in acre-feet).	Accuracy.
	Maximum.	Minimum.	Mean.		
October	197	112	144	8,850	B.
November	172	....	142	8,450	B.
December	188	....	156	9,590	B.
January	....	....	146	8,980	C.
February	173	....	157	8,720	C.
March	....	....	188	11,600	C.
April	585	215	332	19,800	C.
May	763	484	586	36,000	A.
June	699	144	410	24,400	A.
July	252	68	134	8,240	A.
August	150	77	96.5	5,930	A.
September	295	138	183	10,900	B.
The year	763	68	223	161,000	

SEVIER RIVER NEAR KINGSTON, UTAH.

Location.—In the NE. ¼ sec. 9 T., 30 S., R. 3 W., just below highway bridge on road from Kingston to Junction, 1¼ miles above mouth of East Fork and 1½ miles northwest of Kingston, Piute County.

Drainage area.—1,110 square miles (measured on topographic maps).

Records available.—June 12, 1914, to September 30, 1915; also several miscellaneous measurements in 1911, published in Water-Supply Paper 310 as "South Fork near Junction, Utah."

Gage.—Stevens water-stage recorder on left bank near bridge, with outside and inside staff gages, August 7, 1914, to September 30, 1915; temporary Stevens water-stage recorder 300 feet downstream, June 12 to July 15, 1914.

Discharge measurements.—Made from cable 300 feet below gage or by wading.

Channel and control.—Bed composed of sand and gravel; shifting. One channel at all stages.

Extremes of discharge.—Maximum mean daily discharge during year, May 17 (estimated 790 second-feet); minimum mean daily discharge, June 28 to July 1 (estimated 20 second-feet).

1914–15: Same as above.

Winter flow.—Stage-discharge relation seriously affected by ice.

Diversions.—Below all diversions above mouth of East Fork.

Regulation.—Flow affected by diversions for irrigation upstream.

Accuracy.—Records fair.

Discharge measurements of Sevier River near Kingston, Utah, during the year ending Sept. 30, 1915.

Date.	Made by—	Gage height.	Discharge.	Date.	Made by—	Gage height.	Discharge.
		Feet.	*Sec.-ft.*			*Feet.*	*Sec.-ft.*
Oct. 20	J. J. Sanford	1.42	113	June 17	J. J. Sanford	3.07	212
Dec. 9	.....do	1.98	167	July 3	.....do	1.34	35
Jan. 18[a]	.....do	1.88	179	16	Porter and Sanford	1.07	23.7
Mar. 13	.....do	2.20	204	29	J. J. Sanford	2.20	99
Apr. 27	.....do	2.92	266	Aug. 10	.....do	1.16	27.3
May 4	.....do	5.24	463	25	.....do	1.34	42
15	.....do	6.02	570	Sept. 6	.....do	3.25	205
28	.....do	5.38	482	6	.....do	3.25	201

[a] Stream partly frozen.

Daily discharge, in second-feet, of Sevier River near Kingston, Utah, for the year ending Sept. 30, 1915.

Day.	Oct.	Nov.	Dec.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.
1	192	136	180	191	203	209	485	485	20	45	48
2	187	136	176	215	198	217	485	498	25	42	94
3	189	130	198	214	196	223	492	576	38	37	199
4	186	120	214	188	202	251	455	650	37	37	320
5	175	120	208	178	204	271	485	580	40	44	300
6	167	123	208	175	196	258	504	492	48	43	208
7	167	123	197	174	195	232	504	485	61	36	187
8	164	120	187	184	195	240	449	449	39	29	175
9	173	120	187	193	205	240	449	498	32	28	168
10	162	120	178	203	205	236	437	537	33	28	163
11	152	124	183	218	204	246	425	480	30	26	152
12	147	127	177	213	203	251	449	433	26	25	140
13	144	138	177	203	205	252	485	390	26	24	142
14	139	145	152	180	214	253	518	351	24	26	142
15	134	147	150	166	249	262	576	317	24	30	145
16	131	145	150	173	292	254	596	281	24	35	136
17	127	152	178	191	243	246	790	212	23	35	132
18	119	157	184	194	227	286	720	215	23	40	135
19	117	151	189	192	242	321	670	224	24	35	135
20	114	156	195	195	230	369	589	204	24	30	129
21	115	168	172	207	217	379	537	183	26	28	109
22	117	167	....	196	218	394	498	164	85	28	104
23	120	167	....	105	228	411	473	100	44	31	97
24	121	177	....	203	232	368	485	40	92	34	100
25	117	184	....	205	234	356	511	30	55	38	100
26	113	189	....	205	237	320	498	40	71	48	90
27	111	192	....	193	231	270	461	48	154	47	80
28	111	192	....	193	230	298	480	20	138	47	70
29	111	195	....	....	227	423	461	20	104	43	60
30	131	197	....	....	214	518	473	20	75	46	50
31	136	....	....	....	216	....	485	....	53	45	....

NOTE.—Discharge determined from a number of fairly well defined curves and indirect method for shifting control. Stream partly frozen Dec. 22 to Jan. 28; mean flow estimated, 155 second-feet, by comparison with record of flow at Junction. Gage stopped Dec. 15–16, Feb. 14, May 17–19, June 5, 23–26, 28–30, July 1–2, Sept. 24–30; discharge estimated by comparison with record of flow of Sevier River near Junction, East Fork of Sevier River near Kingston, and Kingston canal.

Monthly discharge of Sevier River near Kingston, Utah, for the year ending Sept. 30, 1915.

Month.	Discharge in second-feet.			Run-off (total in acre-feet).	Accuracy.
	Maximum.	Minimum.	Mean.		
October	192	111	142	8,730	A.
November	197	120	151	8,980	A.
December	214	....	[a] 174	10,700	B.
January	....	....	[a] 159	9,780	C.
February	218	166	194	10,800	B.
March	292	195	219	13,500	B.
April	518	209	295	17,600	B.
May	790	425	514	31,600	B.
June	650	20	307	18,300	B.
July	154	20	47.4	2,910	B
August	48	24	35.8	2,200	B
September	320	48	137	8,150	B.
The year	790	20	197	143,000	

[a] Estimated.

SEVIER RIVER NEAR JUNCTION, UTAH.

LOCATION.—In the SE. ¼ sec. 34, T. 29 S., R. 3 W., at Harris's ranch, about one-fourth mile below the junction of East Fork, and 1½ miles east of Junction, Piute County.

Drainage area.—2,890 square miles (measured on topographic maps).

Records available.—June 1 to September 2, 1911; May 1, 1912, to September 30, 1915.

Gage.—Friez water-stage recorder on left bank, May 20 to September 30, 1915; October 20, 1914, to May 20, 1915, Friez water-stage recorder on right bank 400 feet downstream; August 26 to October 19, 1914, vertical staff, original datum; August 3 to 25, 1914, Friez water-stage recorder, original place and datum; June 20 to August 2, 1914, temporary vertical staff on left bank about 100 feet upstream; May 1, 1912, to May 25, 1914, Friez water-stage recorder, original datum; June 1 to September 2, 1911, original gage, inclined staff, on right bank.

Discharge measurements.—Made from cable or by wading.

Channel and control.—Bed composed of gravel; shifts during high stages. Rating affected by backwater from Piute reservoir when full.

Extremes of discharge.—Maximum stage recorded during year, 3.66 feet (4.18 feet, new datum) May 16 (discharge determined by indirect method for shifting control, 1,230 second-feet); minimum stage from water-stage recorder, 0.91 foot (new datum), at midnight September 30 (discharge, 79 second-feet).

1911–1915: Maximum discharge occurred when gage was washed out on May 27, 1914, due to the failure of the Hatchtown dam (mean daily discharge estimated, 5,600 second-feet): minimum stage recorded, —0.25 foot, June 3 to 5, 1913 (discharge, 33 second-feet).

Winter flow.—Stage-discharge relation somewhat affected by ice.

Diversions.—Several irrigation diversions above station.

Regulation.—Flow largely controlled by the operation of gates in dam of Otter Creek reservoir on East Fork and of the Hatchtown reservoir before it went out on May 25, 1914.

Accuracy.—Records fair.

Discharge measurements of Sevier River near Junction, Utah, during the year ending Sept. 30, 1915.

Date.	Made by—	Gage height.	Discharge.	Date.	Made by—	Gage height.	Discharge.
		Feet.	*Sec.-ft.*			*Feet.*	*Sec.-ft.*
Oct. 20	J. J. Sanford	0.28	123	June 14	J. J. Sanford	1.84	355
Dec. 8	.....do	.73	212	17	.....do	1.48	228
Jan. 18[a]	.....do	.40	145	July 3	.....do	1.92	383
Mar. 18	.....do	.94	254	16	Porter and Sanford	1.80	306
Apr. 26	.....do	1.20	317	16	.....do	1.80	313
May 4	.....do	1.98	581	30	J. J. Sanford	2.14	437
15	.....do	3.00	979	Aug. 10	.....do	1.94	370
20	.....do	[b]2.50	727	26	.....do	1.71	285
28	.....do	2.60	614	Sept. 20	.....do	1.68	278
31	.....do	2.62	617				

[a] Some shore ice.

[b] New gage read 3.02.

Daily discharge, in second-feet, of Sevier River near Junction, Utah, for the year ending Sept. 30, 1915.

Day.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.
1	200	160	196	159	198	202	237	694	618	353	376	275
2	204	150	192	166	224	204	381	664	618	370	362	310
3	213	148	220	166	222	202	401	612	646	380	352	362
4	211	147	235	192	200	204	443	579	783	387	349	478
5	180	150	236	180	184	204	466	608	756	380	359	512
6	173	155	222	162	186	198	460	660	708	380	369	441
7	169	159	211	176	186	200	429	656	[illegible]	387	366	424
8	180	155	200	166	184	200	423	612	596	346	362	403
9	184	152	194	184	190	209	426	615	578	326	366	400
10	171	152	186	184	220	207	426	612	618	329	356	383
11	162	159	194	166	240	207	426	634	582	326	349	379
12	162	160	196	176	231	207	300	721	499	326	345	373
13	156	171	184	184	211	213	384	812	418	329	342	362
14	162	176	170	200	200	226	406	908	370	323	349	356
15	145	171	155	194	196	273	404	988	322	320	352	342
16	145	175	159	173	198	318	390	1,230	286	313	352	297
17	145	176	184	152	215	290	376	1,205	226	320	356	294
18	131	192	209	145	220	270	398	1,070	202	320	362	291
19	131	188	222	162	211	270	[illegible]	928	197	329	356	291
20	128	184	209	173	215	266	[illegible]	790	186	326	284	278
21	133	211	180	180	213	251	[illegible]	660	164	326	268	275
22	136	196	152	184	204	242	[illegible]	620	148	336	265	268
23	140	207	155	148	200	249	[illegible]	580	322	345	262	259
24	145	209	159	131	207	256	487	578	316	403	259	252
25	145	211	159	180	211	256	381	614	302	386	268	252
26	145	215	180	162	211	254	326	600	289	407	281	240
27	145	222	209	148	196	242	282	549	283	478	272	234
28	145	213	226	200	194	237	282	596	283	458	265	216
29	135	220	196	207	......	231	426	600	322	430	268	123
30	159	218	171	211	......	220	679	603	346	413	272	93
31	162	......	166	211	......	218	......	621	......	386	278	......

NOTE.—Discharge determined from a number of well-defined curves. Some shore ice exists for short periods during winter; measurements and climatic data indicate no effect of backwater; open-water rating curve used.

Monthly discharge of Sevier River near Junction, Utah, for the year ending Sept. 30, 1915.

Month.	Discharge in second-feet.			Run-off (total in acre-feet).	Accuracy.
	Maximum.	Minimum.	Mean.		
October	213	128	159	9,780	B.
November	222	147	180	10,700	B.
December	235	152	191	11,700	A.
January	211	131	175	10,800	B.
February	240	184	206	11,400	B.
March	318	198	233	14,300	A.
April	679	237	419	24,900	B.
May	1,230	549	717	44,100	A
June	783	148	421	25,100	A
July	478	313	363	22,300	A
August	376	259	323	19,900	A.
September	512	93	315	18,700	A.
The year	1,230	93	309	224,000	

SEVIER RIVER BELOW PIUTE DAM, NEAR MARYSVALE, UTAH.

LOCATION.—In sec. 34, T. 28 S., R. 3 W., about 700 yards below the dam of the Piute reservoir, 11 miles south of Marysvale, Piute County.

DRAINAGE AREA.—2,440 square miles (measured on topographic maps).

RECORDS AVAILABLE.—May 17 to August 31, 1911; May 1, 1912, to September 30, 1915.

Gage.—Friez water-stage recorder about 500 feet below site of former gage, May 4, 1912, to September 30, 1915, new datum; sloping gage on right bank, May 17 to August 31, 1911.

Discharge measurements.—Made from cable 100 yards above gage or by wading.

Channel and control.—Bed composed of sand and loam. Control is a riffle of heavy gravel and rocks located at the gage; practically permanent, shifting only slightly in 1915. One channel at all stages.

Extremes of discharge.—Maximum stage recorded during year, 2.15 feet April 19–24 (discharge, 706 second-feet); minimum stage, —0.06 foot December 19 and January 16 (discharge, 30 second-feet).

1911–1915: Maximum stage recorded, 3.0 feet May 27, 1914 (discharge, 1,380 second-feet); minimum stage, —0.52 foot October 25, 1913 (discharge, 2.6 second-feet).

Winter flow.—Stage-discharge relation not seriously affected by ice; open-water rating curves used.

Diversions.—No water diverted between this station and that near Junction.

Regulation.—Flow past station controlled absolutely by operation of gates in dam above.

Accuracy.— Records excellent. Sufficient current-meter measurements were made to give well-defined rating curves between the periods of slight shifts in control and to determine the flow during shifting periods.

Discharge measurements of Sevier River below Piute dam, near Marysvale, Utah, during the year ending Sept. 30, 1915.

[Made by J. J. Sanford.]

Date.	Gage height.	Discharge.	Date.	Gage height.	Discharge.	Date.	Gage height.	Discharge.
	Feet.	*Sec.-ft.*		*Feet.*	*Sec.-ft.*		*Feet.*	*Sec.-ft.*
Dec. 9	1.28	254	Apr. 26	2.08	627	July 30	2.01	611
Jan. 16	—0.06	32	26	2.08	650	Aug. 18	1.93	567
19	[a] 0.10	29	June 2	1.78	463	26	1.67	408
Mar. 10	.17	36.7	17	1.86	524			

[a] Changed control, raising gage height from —0.06 to 0.10.

Daily discharge, in second-feet, of Sevier River below Piute dam, near Marysvale, Utah, for the year ending Sept. 30, 1915.

Day.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.
1	398	258	262	......	33	37	188	655	477	550	608	407
2	398	255	286	......	33	38	318	655	472	550	601	398
3	398	252	276	......	34	38	322	655	466	543	601	410
4	388	249	272	......	34	38	326	655	472	601	595	408
5	384	249	276	......	35	38	326	649	477	649	595	406
6	380	243	268	......	35	39	326	642	477	649	588	404
7	375	240	265	......	35	39	326	642	477	642	588	402
8	371	240	252	......	35	39	326	615	477	642	582	400
9	367	237	246	......	35	38	326	595	477	642	582	402
10	367	237	225	......	35	37	326	595	477	628	575	400
11	367	234	258	......	35	38	326	595	477	563	575	398
12	362	231	246	......	35	39	397	595	477	588	569	396
13	362	262	243	......	35	40	450	595	477	635	569	396
14	354	297	268	......	35	40	450	595	477	635	563	396
15	350	279	276	......	35	40	450	595	507	628	563	396
16	346	265	313	......	36	40	450	595	513	628	556	396
17	346	252	204	......	36	40	489	601	513	628	556	396
18	337	240	37	......	36	41	575	608	519	628	556	391
19	333	237	30	30	37	41	669	615	525	628	556	387
20	321	231	......	30	37	41	706	628	531	628	501	387
21	317	234	......	30	37	41	706	628	531	621	402	387
22	309	234	......	30	37	42	706	543	525	628	402	387
23	301	240	......	30	37	42	706	483	525	621	407	378
24	293	243	......	30	37	44	706	483	525	621	407	368
25	290	243	......	31	37	44	684	489	525	615	407	368
26	286	249	......	31	37	45	655	495	550	615	407	368
27	279	252	......	31	37	45	655	495	563	615	412	368
28	276	258	......	32	37	45	655	495	556	615	412	368
29	272	262	......	32	......	45	655	489	556	615	412	368
30	265	262	......	32	......	44	655	477	550	608	407	364
31	262	......	......	32	......	57	......	477	......	608	407	......

NOTE.—Discharge determined as follows: Oct. 1 to Dec. 19, Jan. 19 to Sept. 1, and Sept. 12–30, from three well-defined curves; Sept. 2–11, by indirect method for shifting control. Gates at dam reported not changed Dec. 20 to Jan. 18, mean flow estimated 30 second-feet.

Monthly discharge of Sevier River below Piute dam, near Marysvale, Utah, for the year ending Sept. 30, 1915.

Month.	Discharge in second-feet.			Run-off (total in acre-feet).	Accuracy.
	Maximum.	Minimum.	Mean.		
October	398	262	334	20,500	A.
November	297	231	249	14,800	A.
December	313	30	157	9,650	A.
January	32	30	30.4	1,870	B.
February	37	33	35.6	1,980	A.
March	57	37	41.1	2,530	A.
April	706	188	495	29,500	A.
May	655	477	579	35,600	A.
June	563	466	506	30,100	A.
July	649	543	615	37,800	A.
August	608	402	515	31,700	A.
September	410	364	390	23,200	A.
The year	706	30	330	239,000	

SEVIER RIVER AT SEVIER, UTAH.

LOCATION.—In the E. ½ sec. 32, T. 25 S., R. 4 W., at the town of Sevier, Sevier County, about 100 yards above the railroad bridge on the Y-spur 50 yards west of the main-line track of the Denver & Rio Grande Railroad, and 45 yards above mouth of Clear Creek.

DRAINAGE AREA.—2,700 square miles.

RECORDS AVAILABLE.—May 20, 1911, to September 30, 1915.

GAGE.—Friez water-stage recorder on right bank, May 16, 1912, to September 30, 1915; original gage, vertical staff nailed to cottonwood tree, May 20, 1911, to January 7, 1912, when carried out by ice; temporary gage, January 8 to February 23, 1912; inclined staff at same site as Friez water-stage recorder, February 24 to May 15, 1911.

Discharge measurements.—Made from cable or by wading.

Channel and control.—Permanent except at sudden high stages.

Extremes of discharge.—Maximum stage recorded during year, 3.44 feet at 4 p. m. May 19 (discharge, 696 second-feet); minimum stage, 1.48 feet at 1 a. m. February 21 (discharge, 46 second-feet).

1911–1915: Maximum stage recorded, 4.75 feet June 3, 1914 (discharge, 1,600 second-feet); minimum stage, 1.29 feet October 26, 1913 (discharge, 15 second-feet).

Winter flow.—Stage-discharge relation affected by ice for short periods.

Diversions.—A few small ditches divert between station and Piute dam.

Regulation.—Flow past the station practically controlled by operation of gates in Piute reservoir dam, about 27 miles above.

Accuracy.—Records good.

Discharge measurements of Sevier River at Sevier, Utah, during the year ending Sept. 30, 1915.

[Made by J. J. Sanford.]

Date.	Gage height.	Discharge.	Date.	Gage height.	Discharge.	Date.	Gage height.	Discharge.
	Feet.	*Sec.-ft.*		*Feet.*	*Sec.-ft.*		*Feet.*	*Sec.-ft.*
Oct. 24	2.74	329	May 26	3.17	543	Aug. 9	3.23	574
Dec. 11	2.62	328	June 7	3.18	568	21	3.22	575
Jan. 13[a]	1.85	60	12	3.25	599	31	2.87	420
Mar. 4	1.56	57	28	3.35	626	Sept. 17	2.88	401
Apr. 24	3.36	645	July 6	3.42	681			
May 13	3.31	638	26	3.37	638			

[a] Stage-discharge relation affected by ice.

Daily discharge, in second-feet, of Sevier River at Sevier, Utah, for the year ending Sept. 30, 1915.

Day.	Oct.	Nov.	Dec.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.
1	413	279	298	......	56	64	653	582	632	648	444
2	413	276	329	......	57	255	653	622	622	638	449
3	409	272	308	......	57	329	653	592	612	627	457
4	405	272	315	......	58	333	653	592	612	612	449
5	396	266	315	......	59	336	664	582	674	612	440
6	388	260	312	......	58	336	664	577	679	612	440
7	388	256	305	......	59	340	664	562	685	612	436
8	388	256	298	......	58	340	664	562	685	612	432
9	388	256	282	......	59	340	617	572	679	607	432
10	384	256	247	......	59	344	612	607	664	607	428
11	380	256	322	......	59	336	612	607	602	602	420
12	376	256	275	......	59	347	617	602	592	592	422
13	372	260	275	48	61	436	622	587	638	597	415
14	368	302	295	48	62	444	632	572	653	592	408
15	364	302	300	48	64	444	632	572	653	602	402
16	364	289	320	48	64	444	648	597	648	602	402
17	364	276	260	48	64	444	658	607	643	597	402
18	360	266	90	48	61	496	664	612	643	587	402
19	360	256	90	48	61	577	690	638	643	587	402
20	356	250	......	48	61	643	685	612	643	587	402
21	352	240	......	56	64	648	685	622	643	487	402
22	345	245	......	56	62	653	664	622	643	444	398
23	341	250	......	54	61	653	562	612	648	444	394
24	313	260	......	54	61	653	558	602	664	449	394
25	302	265	......	53	59	653	558	587	653	453	394
26	306	275	......	53	59	653	553	582	658	449	398
27	302	280	......	48	58	653	543	627	664	440	402
28	299	285	......	56	56	653	543	643	658	436	398
29	292	295	......	......	56	653	558	638	658	436	394
30	289	295	......	......	53	653	558	632	653	424	390
31	285	......	......	......	53	......	562	......	643	436	......

Note.—Discharge determined from three well-defined curves, applicable Oct. 1 to Nov. 20, Nov. 29 to Sept. 11, and Sept. 16 to 30, respectively. Mean flow estimated on account of ice Dec. 20 to Jan. 31, 60 second-feet, Feb. 1–12, 55 second-feet. Discharge estimated by comparison with record of flow at Piute dam, owing to ice Nov. 21–28, and owing to stopping of clock Dec. 12–18, Mar, 2–3.

Monthly discharge of Sevier River at Sevier, Utah, for the year ending Sept. 30, 1915.

Month.	Discharge in second-feet.			Run-off (total in acre-feet).	Accuracy.
	Maximum.	Minimum.	Mean.		
October	413	285	357	22,000	A.
November	302	240	268	15,900	B.
December	329	....	192	11,800	B.
January	....	....	[a]60	3,690	B.
February	....	....	52.6	2,920	B.
March	64	53	59.3	3,650	B.
April	653	64	472	28,100	A.
May	690	543	623	38,300	A.
June	643	562	601	35,800	A.
July	685	592	648	39,800	A.
August	648	424	549	33,800	A.
September	457	390	415	24,700	B.
The year	690	48	360	260,000	

[a] Estimated.

SEVIER RIVER NEAR VERMILION, UTAH.

Location.—In the NE. ¼ sec. 19, T. 22 S., R. 1 W., at highway bridge half a mile below Rockyford dam, 2 miles below Vermilion, Sevier County, and 4 miles above mouth of Lost Creek.

Drainage area.—3,340 square miles (measured on topographic maps).

Records available.—July 15 to September 23, 1912; July 31, 1914, to September 30, 1915.

Gage.—Vertical staff on right bank, July 31, 1914, to September 30, 1915; original gage used in 1912, one-fourth mile below.

Discharge measurements.—Made by wading or from highway bridge.

Channel and control.—Fairly permanent.

Extremes of discharge.—Maximum stage recorded during year, 5.50 feet at 5 p. m., November 24 (discharge, 658 second-feet); minimum stage, 3.10 feet July 9, 10, 28, 31, and August 1 (discharge, 2 second-feet).

1912, 1914–15: Same as above.

Winter flow.—Stage-discharge relation not affected by ice in 1915.

Diversions.—Entire flow diverted above station during low-water season; flow past the station at such times represents seepage and return flow from canals.

Regulation.—Flow past station regulated to a large extent by dams and reservoirs above.

Accuracy.—Records good.

Discharge measurements of Sevier River near Vermilion, Utah, during the year ending Sept. 30, 1915.

Date.	Made by—	Gage height.	Discharge.	Date.	Made by—	Gage height.	Discharge.
		Feet.	*Sec.-ft.*			*Feet.*	*Sec.-ft.*
Oct. 28	J. J. Sanford	4.74	258	June 1	J. C. Dort	3.80	45.6
Dec. 12	.....do	5.02	416	11	J. J. Sanford	4.08	88
Jan. 22	.....do	4.46	201	23	.....do	3.25	5.5
Feb. 7	E. A. Porter	4.48	216	July 9	.....do	3.10	2.4
Mar. 24	J. J. Sanford	4.24	125	20	.....do	3.12	[a]3.0
May 6	J. C. Dort	4.33	137	Aug. 14	.....do	3.20	[a]5.0
7	J. J. Sanford	4.36	156	23	J. C. Dort	3.12	[a]2.0

[a] Discharge estimated.

Daily discharge, in second-feet, of Sevier River near Vermilion, Utah, for the year ending Sept. 30, 1915.

Day.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.
1	201	239	522	196	202	229	85	33	54	3	2	3
2	204	232	449	194	219	225	74	35	44	3	8	3
3	210	226	413	196	252	212	78	74	35	3	8	5
4	226	216	445	205	235	210	78	92	28	3	8	7
5	259	213	454	196	219	209	123	130	28	3	8	8
6	265	210	459	196	208	197	123	139	28	3	8	7
7	265	207	464	202	210	196	110	148	28	3	8	7
8	272	201	464	216	219	200	104	148	316	3	8	7
9	279	204	464	205	229	190	104	148	130	2	8	7
10	279	196	426	202	248	182	76	130	51	2	8	7
11	283	64	408	205	262	170	71	121	76	4	8	7
12	283	23	408	202	262	168	64	108	62	4	8	7
13	265	149	382	202	245	166	65	92	26	3	8	7
14	265	331	373	199	238	152	60	92	8	3	6	7
15	265	315	311	196	226	147	59	92	8	3	6	7
16	265	319	327	202	226	148	59	96	8	3	6	7
17	265	315	331	194	232	148	59	108	7	7	6	72
18	265	323	364	176	226	144	59	74	7	7	4	50
19	259	323	327	180	229	139	56	88	7	3	3	46
20	252	339	255	202	232	134	10	144	7	3	3	46
21	242	339	242	205	229	130	10	226	7	3	3	46
22	252	339	222	202	238	130	13	245	7	3	3	74
23	252	352	210	163	219	126	15	245	6	3	3	74
24	259	502	188	202	229	121	17	239	7	3	3	68
25	265	436	202	202	248	108	15	239	7	3	3	74
26	272	390	202	202	255	104	35	144	5	3	3	74
27	262	390	205	194	245	100	38	134	3	3	3	74
28	255	390	202	199	229	104	37	125	3	2	3	74
29	252	413	196	202	....	104	33	62	3	3	3	46
30	248	417	186	216	....	102	33	58	3	3	3	46
31	245	....	194	210	....	96	....	54	....	2	3	....

NOTE.—Discharge determined from two well-defined curves, one applicable Oct. 1 to Nov. 12, Mar. 16 to Sept. 30, the other, Nov. 13 to Mar. 1. Indirect method for shifting control used Mar. 2-15. Discharge Mar. 23 and May 30 interpolated. Some shore ice reported occasionally during December and January, but there is no indication of backwater at such times, and the open-water rating curve has been used.

Monthly discharge of Sevier River near Vermilion, Utah, for the year ending Sept. 30, 1915.

Month.	Discharge in second-feet.			Run-off (total in acre-feet).	Accuracy.
	Maximum.	Minimum.	Mean.		
October	283	201	256	15,700	A.
November	502	23	287	17,100	B.
December	522	186	332	20,400	A.
January	216	163	199	12,200	B.
February	262	202	233	12,900	B.
March	229	96	155	9,530	B.
April	123	10	58.8	3,500	B.
May	245	33	125	7,690	A.
June	316	3	33.6	2,000	B.
July	7	2	3.2	197	C.
August	8	2	5.3	326	C.
September	74	3	32.5	1,930	B.
The year	522	2	143	103,000	

SEVIER RIVER NEAR GUNNISON, UTAH.

Location.—About 60 rods west of the southeast corner of sec. 14, T. 19 S., R. 1 W., near the bridge on the county road from Gunnison to West View precinct, about 3 miles west of Gunnison post office, Sanpete County. San Pitch River enters from the east about half a mile below station.

Drainage area.—3,990 square miles (measured on topographic maps).

Records available.—June 29, 1900, to September 30, 1915.

Gage.—Stevens water-stage recorder on right bank 200 feet below bridge, May 19, 1914, to September 30, 1915; vertical staff on right bridge abutment, June 29, 1900, to May 18, 1914; datum lowered 1 foot in September, 1910.

Discharge measurements.—Made from cable about 450 feet above gage or by wading.

Channel and control.—Bed composed of fine sand and gravel; shifts at high stages. One channel at all stages. Stage-discharge relation affected at times by backwater from San Pitch River.

Extremes of discharge.—Maximum stage recorded during year, 3.37 feet at 2.30 a. m. December 2 (discharge, 559 second-feet); minimum stage, 1.97 feet July 19, 20, and 26 (discharge, 61 second-feet).

1900–1915: Maximum stage recorded, 6.34 feet May 28, 1906 (discharge 2,240 second-feet); minimum stage 1.10 feet April 30, 1911 (discharge zero).

Winter flow.—Stage-discharge relation not affected by ice in 1915.

Diversions.—During the irrigation season the greater part of flow is diverted above station.

Regulation.—Flow at gage is affected by the operation of the Piute reservoir gates and numerous irrigation diversions above.

Accuracy.—Frequent discharge measurements were made to determine changes in stage-discharge relation. Records good.

Discharge measurements of Sevier River near Gunnison, Utah, during the year ending Sept. 30, 1915.

Date.	Made by—	Gage height.	Discharge.	Date.	Made by—	Gage height.	Discharge.
		Feet.	*Sec.-ft.*			*Feet.*	*Sec.-ft.*
Oct. 6	R. W. Davenport	2.86	378	May 7	J. C. Dort	2.79	215
29	J. J. Sanford	2.88	395	26	do	3.45	401
Dec. 12	do	3.02	436	June 12	do	2.48	150
Jan. 22	do	2.66	340	26	do	2.10	77
Feb. 23	E. A. Porter	2.74	339	July 9	Porter and Dort	2.04	69
Mar. 6	L. W. Jordan	2.70	323	Aug. 2	J. C. Dort	2.10	81
22	J. J. Sandford	[a]4.30	272	31	do	2.10	77
23	do	[a]4.30	266	Sept. 14	do	2.48	142
Apr. 22	J. C. Dort	2.17	88				

[a] Stage-discharge relation affected by backwater from San Pitch River.

Daily discharge, in second-feet, of Sevier River near Gunnison, Utah, for the year ending Sept. 30, 1915.

Day.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.
1	301	368	523	275	301	332	289	115	286	72	68	78
2	294	358	548	275	311	336	278	104	278	72	72	82
3	298	350	520	272	340	325	275	115	202	73	92	110
4	336	358	498	278	361	318	280	144	256	71	105	157
5	365	336	516	275	340	325	290	180	336	69	108	136
6	379	325	520	266	311	318	320	220	246	65	110	124
7	408	329	520	272	301	311	330	220	220	65	105	121
8	437	318	527	272	308	308	325	223	212	73	104	121
9	444	311	505	284	322	308	294	215	294	69	96	117
10	448	300	484	281	332	308	256	223	272	69	83	128
11	444	210	473	278	358	304	225	217	159	69	85	146
12	444	174	437	278	379	304	207	223	144	68	85	140
13	433	220	426	278	372	304	197	238	136	68	82	142
14	419	272	422	284	343	302	184	238	123	68	75	144
15	419	390	426	287	332	300	163	251	117	66	81	142
16	426	390	451	287	329	298	136	249	104	66	85	144
17	448	390	426	294	340	296	142	278	89	71	86	150
18	455	390	401	304	347	290	126	292	83	72	85	180
19	448	390	448	332	347	285	136	264	79	65	82	180
20	437	390	426	343	347	280	130	292	72	61	75	175
21	415	390	361	291	342	275	114	339	71	65	72	168
22	408	390	332	318	337	272	96	401	75	71	72	163
23	412	401	361	329	332	266	89	432	73	73	69	150
24	408	422	361	248	336	270	92	426	71	87	71	146
25	408	494	358	291	340	275	89	416	73	102	75	14
26	404	469	294	318	365	280	78	401	75	87	82	146
27	397	462	284	347	358	270	83	365	72	89	81	150
28	390	484	278	284	347	270	85	339	65	72	79	157
29	383	516	275	284	....	280	85	325	66	68	78	148
30	372	502	269	298	....	280	124	303	71	66	78	146
31	365	....	263	301	....	280	....	300	....	68	79	....

NOTE.—Discharge determined from two well-defined curves applicable Oct. 1 to Mar. 12 and Apr. 1 to Sept. 30. Discharge estimated by comparison with records of flow of Sevier River near Vermilion, and at Clark's bridge, and San Pitch near Gunnison, Nov. 10-13, 15-17, 19-21, Feb. 21-22, Sept 13 owing to clock stopping, and Mar. 13-31, Apr. 4-7, owing to backwater from San Pitch River. Stage-discharge relation not affected by ice.

Monthly discharge of Sevier River near Gunnison, Utah, for the year ending Sept. 30, 1915.

Month.	Discharge in second-feet.			Run-off (total in acre-feet).	Accuracy.
	Maximum.	Minimum.	Mean.		
October	455	294	401	24,700	A.
November	516	174	370	22,000	B.
December	548	263	417	25,600	B.
January	347	266	291	17,900	B.
February	379	301	338	18,800	B.
March	336	266	296	18,200	C.
April	330	78	184	10,900	A.
May	432	104	269	16,500	A.
June	336	65	147	8,750	A.
July	102	61	71.6	4,400	A.
August	110	68	83.8	5,150	A.
September	180	78	141	8,390	A.
The year	548	61	251	181,000	

SEVIER RIVER AT CLARK'S BRIDGE, NEAR FAYETTE, UTAH.

LOCATION.—In the SW. ¼ sec. 13, T. 18 S., R. 1 W., at Clark's bridge, about 1½ miles northwest of Fayette, Sanpete County.

DRAINAGE AREA.—4,960 square miles (measured on topographic maps).

RECORDS AVAILABLE.—March 17 to September 30, 1914; March 8 to September 30, 1915.

GAGE.—May 8 to September 30, 1915, Stevens water-stage recorder on right bank immediately below bridge. Previous to May 8, 1915, vertical staff gage fastened to downstream side of right bridge abutment.

Discharge measurements.—Made from bridge or by wading.

Channel and control.—Bed composed of fine gravel, sand, and clay; shifting. One channel at all stages.

Extremes of discharge.—Maximum stage recorded during year, 3.87 feet at 8 a. m. March 21 (discharge, 903 second-feet); minimum stage 0.70 feet midnight July 19 (discharge, 77 second-feet).

1914–15: Maximum stage recorded, 6.7 feet June 8, 1914 (discharge, 2,090 second-feet); minimum stage, 0.70 feet July 19, 1915 (discharge, 77 second-feet).

Winter flow.—Observations discontinued at end of irrigation season.

Diversions.—Below all diversions above Sevier bridge reservoir.

Regulation.—Flow at station is affected by operation of Piute reservoir gates and by numerous irrigation diversions.

Accuracy.—Records considered good, owing to frequency of current-meter measurements.

Cooperation.—Gage record and many current-meter measurements furnished by lower Sevier River water users.

Discharge measurements of Sevier River at Clark's bridge, near Fayette, Utah, during the year ending Sept. 30, 1915.

Date.	Made by—	Gage height.	Discharge.	Date.	Made by—	Gage height.	Discharge.
		Feet.	*Sec.-ft.*			*Feet.*	*Sec.-ft.*
Mar. 8	L. W. Jordan	2.34	373	June 18	J. C. Dort	1.10	108
23	J. J. Sanford	3.85	888	25	do	.96	103
Apr. 23	J. C. Dort	1.15	118	July 1	do	.89	86
May 10	do	1.87	267	9	Porter and Dort	.84	86
14	do	1.88	272	26	J. C. Dort	.95	115
14	do	1.86	248	Aug. 3	do	.85	99
26	do	2.70	436	25	do	.78	96
June 4	do	1.89	250	31	do	.82	94
12	do	1.50	180	Sept. 17	do	1.39	166

Daily discharge, in second-feet, of Sevier River at Clark's bridge, near Fayette, Utah, for the year ending Sept. 30, 1915.

Day.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.
1		337	164	323	90	89	93
2		332	156	310	93	86	97
3		321	147	251	93	104	180
4		437	174	263	89	120	186
5		491	216	400	85	128	172
6		506	248	326	83	130	151
7		476	265	280	83	126	147
8	378	464	258	252	85	123	154
9	378	461	243	305	85	115	151
10	378	337	200	354	80	100	160
11	380	268	250	209	78	104	180
12	430	240	248	182	77	104	170
13	446	231	258	170	77	101	175
14	490	231	266	158	80	92	165
15	592	214	270	146	79	96	159
16	658	198	259	131	80	106	160
17	778	176	296	116	84	104	163
18	820	153	323	108	89	101	190
19	830	162	297	107	84	99	191
20	880	172	338	100	78	92	184
21	900	152	365	100	85	87	176
22	880	122	435	103	89	87	170
23	882	113	452	104	93	85	170
24	805	118	452	98	103	85	153
25	805	124	436	100	123	89	147
26	600	116	435	98	115	92	156
27	436	98	385	98	107	97	170
28	500	114	360	95	97	98	189
29	492	131	360	87	89	92	170
30	500	148	340	92	83	92	160
31	480		323		86	94	

Note.—Discharge determined from a series of parallel rating curves and indirect method for shifting control. Clock stopped Apr. 21–22, 29–30; discharge interpolated.

Monthly discharge of Sevier River at Clark's bridge, near Fayette, Utah, for the year ending Sept. 30, 1915.

Month.	Discharge in second-feet.			Run-off (total in acre-feet).	Accuracy.
	Maximum.	Minimum.	Mean.		
March 8–31	900	378	613	29,200	B.
April	506	98	248	14,800	B.
May	452	147	299	18,400	A.
June	400	87	182	10,800	A.
July	123	77	88.5	5,440	A.
August	130	85	100	6,170	A.
September	191	93	161	9,580	A.
The period				94,400	

SEVIER RIVER NEAR JUAB, UTAH.

Location.—In the NE. ¼ sec. 2, T. 17 S., R. 2 W., about 1,600 feet downstream from the Sevier bridge dam, and 14 miles southwest of Juab; Juab County.

Drainage area.—5,120 square miles (measured on topographic maps).

Records available.—September 23, 1911, to September 30, 1915.

Gage.—Stevens water-stage recorder on left bank, 500 feet below old gage, April 16, 1914, to September 30, 1915; inclined staff about 1,000 feet below Sevier bridge dam, on right bank, September 23, 1911, to April 15, 1914.

Discharge measurements.—Made from cable 600 feet above gage or by wading.

Channel and control.—Bed composed of sand, clay, and fine gravel. One channel at all stages. Artificial control of rocks about 40 feet below gage; permanent except during high stages.

Extremes of discharge.—Maximum stage recorded during year, 5.46 feet at 1 to 6 a. m. June 22 (discharge, 1,079 second-feet); minimum mean daily discharge, 3 second-feet November 22–23.

1911–1915: Maximum stage recorded, 7.8 feet May 28–29, June 4–12, 1914, discharge 2,030 second-feet; minimum mean daily discharge, 0.5 second-foot October 14, 1911.

Winter flow.—Stage-discharge relation not affected by ice.

Diversions.—None between this station and that near Gunnison.

Regulation.—Flow controlled by gates in dam just above station.

Accuracy.—Records good.

Cooperation.—Gage-height record and many discharge measurements furnished by lower Sevier River Water Users.

Discharge measurements of Sevier River near Juab, Utah, during the year ending Sept. 30, 1915.

Date.	Made by—	Gage height.	Discharge.	Date.	Made by—	Gage height.	Discharge.
		Feet.	*Sec.-ft.*			*Feet.*	*Sec.-ft.*
Oct. 7	R. W. Davenport	3.70	516	June 10	J. C. Dort	2.66	271
Nov. 17	J. J. Sanford	1.30	4.2	18	.....do	3.83	590
Dec. 13	.....do	1.38	5.9	July 24	.....do	3.32	434
Jan. 28	.....do	1.56	17.6	Sept. 1	F. W. Cottrell	2.22	175
Feb. 19	F. W. Cottrell	1.58	18.3	17	J. C. Dort	1.92	111
Mar. 10	L. W. Jordan	[a] 1.20	4.6	22	F. W. Cottrell	2.43	228
May 15	J. C. Dort	4.40	734	28	.....do	2.51	240
June 4	.....do	2.12	145				

[a] Gage read 1.30 before changing control below gage.

Daily discharge, in second-feet, of Sevier River near Juab, Utah, for the year ending Sept. 30, 1915.

Day.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.
1	506	503	6	16	13	4	740	836	215	612	413	168
2	439	503	6	16	13	4	432	772	215	584	408	164
3	500	500	6	16	13	4	76	740	213	584	405	162
4	516	500	6	16	13	4	100	740	179	570	403	126
5	516	497	6	16	13	4	311	710	146	570	400	126
6	516	497	6	17	13	4	438	652	144	570	398	135
7	516	494	6	18	13	4	415	624	154	556	392	171
8	522	490	6	18	13	4	220	624	174	484	390	239
9	519	487	6	18	13	4	237	624	220	516	387	275
10	519	484	6	18	13	4	254	624	271	530	385	263
11	519	478	6	18	13	4	240	652	341	530	377	219
12	522	458	6	18	13	5	328	680	451	516	374	225
13	519	708	6	18	13	5	331	680	502	516	369	171
14	519	518	6	18	13	5	316	710	530	516	366	84
15	516	43	6	18	13	5	324	740	556	516	361	91
16	516	18	6	18	13	5	316	740	530	502	336	101
17	516	4	6	18	13	5	318	740	530	489	334	104
18	516	4	7	18	19	5	318	772	584	486	331	81
19	516	4	7	18	19	5	451	772	423	481	331	66
20	513	4	7	18	13	5	486	710	597	478	346	107
21	513	4	7	18	13	5	489	597	742	476	348	186
22	513	3	7	18	4	5	489	597	1,060	473	369	191
23	513	3	7	18	4	255	476	584	937	457	312	214
24	513	4	7	18	4	772	654	570	740	443	235	235
25	510	4	7	18	4	820	996	489	710	438	210	263
26	510	5	7	18	4	820	906	451	710	432	208	316
27	510	6	7	18	4	820	804	435	680	430	208	384
28	510	6	7	18	4	823	836	408	652	424	208	451
29	510	6	7	18	....	820	868	405	652	422	207	473
30	506	6	16	13	....	820	900	319	624	418	182	476
31	506	....	16	13	....	817	....	215	......	416	168	....

NOTE.—Discharge determined from two well-defined curves, one applicable prior to Mar. 10, when control was changed; the other after that date. Clock stopped Nov. 25-28, Dec. 7-12, 14-19, Aug. 23-28; discharge estimated by comparison with record of flow at Mills. Water-stage recorder not working Nov. 27 to Mar. 10; discharge determined from staff gage read once daily.

Monthly discharge of Sevier River near Juab, Utah, for the year ending Sept. 30, 1915.

Month.	Discharge in second-feet.			Run-off (total in acre-feet).	Accuracy.
	Maximum.	Minimum.	Mean.		
October	522	439	512	31,500	B.
November	708	3	241	14,300	B.
December	16	....	7.03	432	C.
January	18	13	17.3	1,060	C.
February	19	4	11.2	622	C.
March	823	4	221	13,600	B.
April	996	78	469	27,900	A.
May	836	215	619	38,100	A.
June	1,060	144	483	28,700	A.
July	612	416	498	30,600	A.
August	413	168	327	20,100	A.
September	476	66	208	12,400	A.
The year	1,060	3	303	219,000	

SEVIER RIVER NEAR MILLS, UTAH.

LOCATION.—In the SW. ¼ sec. 36, T. 14 S., R. 3 W., opposite milepost 682 on the Los Angeles & Salt Lake Railroad (Lynndyl cut-off), and about 7 miles below Mills post office, Juab County.

DRAINAGE AREA.—5,800 square miles.

RECORDS AVAILABLE.—April 22, 1914, to September 30, 1915.

GAGE.—Stevens water-stage recorder, with outside and inside staff gages, on left bank 500 feet above railroad bridge.

DISCHARGE MEASUREMENTS.—Made from cable 100 feet above gage or by wading.

CHANNEL AND CONTROL.—Bed composed of heavy gravel and rock; permanent; one channel at all stages.

EXTREMES OF DISCHARGE.—Maximum stage recorded during year, 5.71 feet (9 hours) on June 23 (discharge, 1,058 second-feet); minimum stage recorded, 3.26 feet December 22 and 23 (discharge, 38 second-feet).

1914–15: Maximum stage recorded, 6.71 feet May 27, 1914 (discharge, 1,910 second-feet); minimum stage, 3.26 feet December 22 and 23, 1914 (discharge, 38 second-feet).

WINTER FLOW.—Stage-discharge relation seriously affected by ice.

REGULATION.—Flow affected by operation of several dams and irrigation diversions above.

ACCURACY.—Records excellent.

COOPERATION.—Gage record and some discharge measurements furnished by lower Sevier River Water Users.

Discharge measurements of Sevier River near Mills, Utah, during the year ending Sept. 30, 1915.

Date.	Made by—	Gage height.	Discharge.	Date.	Made by—	Gage height.	Discharge.
		Feet.	*Sec.-ft.*			*Feet.*	*Sec.-ft.*
Oct. 9	R. W. Davenport	4.98	583	May 15	J. C. Dort	5.20	742
Nov. 19	J. J. Sanford	3.48	55	.....do	...do	4.22	212
Dec. 14	.....do	3.50	64	July 19	...do	4.88	515
Feb. 8	Lynn Crandall	3.36	54	29	L. W. Jordan	4.78	435
Mar. 13	L. W. Jordan	3.42	54	Sept. 5	J. C. Dort	4.08	165
Apr. 27	J. C. Dort	5.38	782				

Daily discharge, in second-feet, of Sevier River near Mills, Utah, for the year ending Sept. 30, 1915.

Day.	Oct.	Nov.	Dec.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.
1	844	......	54	......	54	823	900	240	645	420	195
2	484	......	53	......	52	678	858	240	612	415	196
3	506	......	52	......	52	195	802	240	606	410	208
4	560	......	52	......	52	134	746	254	606	410	198
5	......	......	52	......	52	224	725	211	606	405	165
6	......	......	52	......	51	450	704	198	606	400	171
7	......	......	52	......	50	467	664	192	599	395	164
8	......	......	52	54	49	329	664	204	536	390	287
9	......	......	51	......	49	269	670	217	524	386	269
10	......	......	52	......	49	281	677	289	548	382	305
11	......	......	52	......	50	277	684	301	548	377	289
12	......	......	60	......	50	328	697	400	542	377	261
13	......	520	56	......	52	350	711	500	536	277	237
14	......	720	62	......	52	350	718	512	530	372	170
15	......	460	52	......	52	341	753	566	524	372	116
16	......	104	53	......	51	350	760	548	518	364	127
17	......	95	54	......	51	341	767	536	506	346	130
18	......	71	54	81	49	341	760	573	494	341	120
19	......	60	54	74	50	425	788	524	489	341	100
20	......	60	53	74	50	494	795	518	489	346	110
21	......	61	53	70	49	506	711	612	494	350	165
22	......	62	46	64	49	500	606	946	489	368	217
23	......	62	46	62	48	494	612	1,050	484	377	230
24	......	57	53	57	710	590	612	816	472	341	265
25	......	55	59	54	851	970	542	739	462	258	265
26	......	55	60	55	858	970	467	725	450	240	305
27	......	54	57	56	858	816	456	704	445	237	350
28	......	55	58	55	858	823	425	677	435	237	460
29	......	58	58	......	858	865	410	677	430	237	500
30	......	57	59	......	858	900	405	651	425	234	510
31	......	......	58	......	851	......	262	......	420	204	......

NOTE.—Discharge determined from a well-defined rating curve. Inlet pipe clogged with mud Oct. 5 to Nov. 16 and frozen Dec. 31 to Feb. 17. Mean flow estimated Oct. 5–31, 555 second-feet; Nov. 1–12, 540 second-feet; Feb. 1–7, 9–17, 55 second-feet. Discharge Sept. 13–20 determined from gage heights which were estimated from observer's readings and range of stage (clock stopped). Discharge estimated by comparison with record of flow at Juab Nov. 13–16, Dec. 31, May 2–3, 5, Sept. 28–30, owing to clogged inlet pipe and defective operation of clock.

Monthly discharge of Sevier River near Mills, Utah, for the year ending Sept. 30, 1915.

Month.	Discharge in second-feet.			Run-off (total in acre-feet).	Accuracy.
	Maximum.	Minimum.	Mean.		
October	844	....	561	34,500	B.
November	720	54	305	18,100	B.
December	62	46	54.2	3,330	B.
January	....	....	60.0	3,690	C.
February	81	....	58.4	3,240	C.
March	858	48	254	15,600	B.
April	970	134	496	29,500	A.
May	900	262	656	40,300	A.
June	1,050	192	495	29,500	A.
July	645	420	518	31,900	A.
August	420	204	345	21,200	A.
September	510	100	234	13,900	A.
The year	1.050	....	338	245,000	

SEVIER RIVER NEAR LYNNDYL, UTAH.

Location.—In the SE. ¼ sec. 27, T. 15 S., R. 5 W., at homestead of P. J. Flahive, 3½ miles southwest of Lynndyl, Millard County.

Drainage area.—6,270 square miles (measured on topographic maps.)

Records available.—April 25, 1914, to September 30, 1915.

Gage.—Stevens water-stage recorder on right bank, with inside and outside staff gages, 1½ miles below highway bridge.

Discharge measurements.—Made by wading or from cable one-fourth mile above gage.

Channel and control.—Bed composed of fine gravel; control permanent except for high stages; one channel at all stages.

Extremes of discharge.—Maximum stage recorded during year, 5.38 feet at 4.30 a. m. June 24 (discharge, 928 second-feet); minimum stage, 1.76 feet at 8 p. m. March 12 (discharge, 40 second-feet).

1914–15: Maximum mean daily discharge June 9, 1914 (estimated, 1,820 second-feet); minimum stage, 1.76 feet March 12, 1915 (discharge, 40 second-feet).

Winter flow.—Stage-discharge relation seriously affected by ice.

Diversions.—Numerous diversions above station.

Regulation.—Flow affected by storage and irrigation diversions above station.

Accuracy.—Rating curve well defined.

Cooperation.—Gage-height record furnished by Lower Sevier River Water Users.

Discharge measurements of Sevier River near Lynndyl, Utah, during the year ending Sept. 30, 1915.

Date.	Made by—	Gage height.	Discharge.	Date.	Made by—	Gage height.	Discharge.
		Feet.	*Sec.-ft.*			*Feet.*	*Sec.-ft.*
Oct. 9	R. W. Davenport	4.15	524	June 6	J. C. Dort	2.47	138
Dec. 15	J. J. Sanford	[a] 1.96	61	July 21	J. W. Thurston	3.54	384
Feb. 8	Lynn Crandall	[a] 2.64	60	Aug. 20	Lynn Crandall	2.98	223
Mar. 13	L. W. Jordan	1.78	41.8	Sept. 6	J. C. Dort	2.46	139
Apr. 28	J. C. Dort	4.76	728				

[a] Stage-discharge relation affected by ice.

Daily discharge, in second feet, of Sevier River near Lynndyl, Utah, for the year ending Sept. 30, 1915.

Day	Oct.	Nov.	Dec.	Feb.	Mar.	Apr.	May.	June.	July	Aug.	Sept.
1	874	442	81	......	46	798	798	191	516	322	151
2	753	440	71	......	46	706	766	180	502	320	146
3	427	440	68	......	46	676	706	176	474	317	157
4	455	440	69	......	45	180	676	191	474	317	159
5	479	442	69	......	45	137	646	199	474	310	153
6	466	442	68	......	45	204	631	146	461	308	139
7	461	442	81	......	44	383	586	128	461	308	135
8	455	445	74	......	43	396	558	123	461	305	146
9	513	442	62	......	43	276	558	128	409	300	174
10	463	437	67	......	42	226	558	132	396	298	215
11	455	440	......	......	42	232	558	184	409	293	255
12	450	445	......	......	41	217	558	206	396	291	237
13	448	419	......	......	42	264	572	310	409	291	210
14	445	575	......	......	42	291	572	396	396	286	206
15	445	591	61	......	42	284	601	409	396	284	110
16	448	341	......	......	41	264	646	461	396	284	110
17	448	189	......	......	43	252	661	448	383	284	112
18	448	135	......	71	46	241	706	448	370	264	114
19	448	107	......	66	48	248	736	488	370	257	112
20	448	96	63	68	48	291	782	406	370	252	104
21	445	85	......	67	81	358	706	449	370	246	90
22	442	79	......	64	67	370	586	520	370	250	102
23	445	79	......	61	55	370	558	868	370	269	146
24	445	72	......	56	56	370	558	896	370	279	160
25	445	69	......	55	620	396	558	646	358	255	182
26	442	69	......	54	782	896	488	601	346	208	202
27	442	69	......	51	800	830	422	586	346	188	241
28	442	71	......	48	800	721	409	558	336	182	310
29	442	107	......	......	800	721	370	544	329	176	350
30	442	71	......	......	800	766	358	544	322	174	406
31	442	......	......	......	800	......	303	......	322	168	......

NOTE.—Discharge determined from two well-defined rating curves, applicable Oct. 1 to Mar. 24, Mar. 26 to Sept. 30, respectively. Stream frozen Dec. 11 to Feb. 17. Mean flow estimated Dec. 11–14, 62 second-feet; Dec. 16–19, 62 second-feet; Dec. 21–31, 60 second-feet; Jan 1–31, 65 second-feet; Feb. 1–8, 60 second-feet; Feb. 9–17, 62 second-feet from measurements and comparison with records of flow at other stations. Gage stopped, discharge estimated as in table, by comparison with records obtained at other stations Mar. 27–31, Apr. 17, Sept. 15–17, Sept. 28–30. Determinations of discharge Apr. 1–3 based on one staff reading daily.

Monthly discharge of Sevier River near Lynndyl, Utah, for the year ending Sept. 30, 1915.

Month.	Discharge in second-feet.			Run-off (total in acre-feet).	Accuracy.
	Maximum.	Minimum.	Mean.		
October	874	442	474	29,100	A.
November	591	69	284	16,900	B
December	81	....	64.2	3,950	B.
January	....	....	65.0	4,000	B
February	....	....	60.7	3,370	B.
March	800	41	211	13,000	B.
April	896	137	412	24,500	A.
May	798	303	587	36,100	A.
June	896	123	385	22,900	A.
July	516	322	399	24,500	A.
August	322	168	267	16,400	A.
September	406	90	178	10,600	A.
The year	896	41	284	205,000	

SEVIER RIVER NEAR DELTA, UTAH.

LOCATION.—In the NW. ¼ sec. 27, T. 16 S., R. 6 W., 1¼ miles below Delta spillway, and 6¼ miles northeast of Delta, Millard County.

DRAINAGE AREA.—7,380 square miles.

RECORDS AVAILABLE.—May 16 to September 24, 1912; March 1, 1913, to September 30, 1915.

GAGE.—Gurley water-stage recorder on left bank at same datum as the inclined staff gage used prior to March 1, 1913.

Discharge measurements.—Made from cable about 100 feet below gage or by wading.

Channel and control.—Bed composed of firm clay and hardpan; right bank may overflow at extremely high stages; one channel at all stages.

Extremes of discharge.—Maximum stage recorded during year, 4.28 feet at 7 a. m. March 31 (discharge, 802 second-feet); minimum mean daily discharge, 30 second-feet November 24.

1912–1915: Maximum stage recorded, 6.82 feet May 31, 1914 (discharge, 1,468 second-feet); minimum mean daily discharge, 15 second-feet July 26, 1914.

Winter flow.—Stage-discharge relation affected by ice at times.

Diversion.—Canal A of the Delta project takes out water 1¼ miles above station.

Regulation.—Flow at station controlled by regulation of the Delta spillway and Sevier bridge reservoir.

Accuracy.—Records good.

Cooperation.—Some discharge measurements furnished by the Delta Land & Water Co.

Discharge measurements of Sevier River near Delta, Utah, during the year ending Sept. 30, 1915.

Date.	Made by—	Gage height.	Discharge.	Date.	Made by—	Gage height.	Discharge.
		Feet.	*Sec.-ft.*			*Feet.*	*Sec.-ft.*
Nov. 21	J. J. Sanford	1.07	60	July 21	J. C. Dort	1.66	179
Dec. 16	.....do	1.07	55	Aug. 20	Lynn Crandall	1.12	78
Feb. 7	Lynn Crandall	1.06	69	Sept. 4	J. C. Dort	1.13	88
May 2	J. C. Dort	2.56	359	20	F. W. Cottrell	1.02	70
June 9	.....do	.97	59	27	.....do	1.33	110
July 1	J. W. Thurston	2.18	282				

Daily discharge, in second-feet, of Sevier River near Delta, Utah, for the year ending Sept. 30, 1915.

Day.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.
1	550	192	170	52	74	64	778	310	227	258	136	72
2	440	202	170	50	77	63	748	360	113	229	127	72
3	186	209	111	49	86	63	692	371	83	184	120	83
4	93	209	88	49	89	63	481	342	89	180	111	77
5	143	208	80	54	89	62	270	314	95	178	103	78
6	204	213	76	56	84	62	180	329	100	214	96	78
7	216	214	76	50	77	62	228	318	90	293	89	73
8	188	209	80	55	80	59	289	174	74	304	84	83
9	233	201	77	52	80	57	279	200	60	264	82	78
10	259	192	69	54	84	56	206	229	62	231	76	78
11	230	186	70	60	110	54	162	202	57	190	72	77
12	188	196	72	54	122	54	142	198	50	176	82	84
13	176	204	65	56	122	53	154	212	47	156	89	82
14	196	270	60	58	111	53	162	208	48	146	84	73
15	220	380	59	......	105	53	95	210	53	156	98	73
16	228	245	59	......	98	53	102	227	102	178	82	77
17	216	94	61	......	95	51	105	242	158	196	73	73
18	218	101	65	......	97	53	108	264	142	182	72	72
19	211	98	65	......	98	54	100	283	125	176	73	69
20	201	70	58	......	95	57	89	424	115	176	77	72
21	189	59	53	......	95	59	103	570	97	178	77	74
22	180	46	54	......	89	74	118	413	106	186	65	89
23	173	37	50	......	84	77	122	335	262	192	67	92
24	173	60	69	......	80	79	111	413	402	196	83	88
25	176	115	60	......	76	184	94	470	268	198	82	102
26	180	130	49	......	77	544	246	458	140	194	86	115
27	184	94	50	......	73	706	371	371	186	188	77	116
28	184	140	53	67	67	757	346	279	240	182	73	111
29	188	194	54	72	......	784	335	321	176	168	82	116
30	191	132	53	78	......	799	266	314	194	156	74	174
31	191	......	53	74	......	796	......	268	......	148	70	......

Note.—Discharge determined from two curves, one well defined below 250 second-feet and poorly defined above that discharge, applicable Oct. 1 to Jan. 14; the other well defined below 400 second-feet and fairly well defined above, applicable Jan. 28 to Sept. 30. Stage-discharge relation affected by anchor ice Jan. 15-27 and mean flow, estimated 60 second-feet.

Monthly discharge of Sevier River near Delta, Utah, for the year ending Sept. 30, 1915.

Month.	Discharge in second-feet.			Run-off (total in acre-feet).	Accuracy.
	Maximum.	Minimum.	Mean.		
October	550	93	213	13,100	A.
November	380	37	163	9,700	B.
December	170	49	71.9	4,420	B.
January	78	....	58.7	3,610	C.
February	122	67	89.8	4,990	C.
March	799	51	193	11,900	B.
April	778	89	249	14,800	B.
May	570	174	310	19,100	A.
June	402	47	132	7,860	A.
July	304	146	195	12,000	A.
August	136	65	85.8	5,280	A.
September	174	69	86.7	5,160	A.
The year	799	37	155	112,000	

SEVIER RIVER AT OASIS, UTAH.

LOCATION.—In the E. ½ sec. 33, T. 17 S., R. 7 W., about three-fourths mile northwest of Oasis, Millard County, 1½ miles below county bridge locally known as Hinckley bridge.

DRAINAGE AREA.—8,080 square miles (measured on topographic maps).

RECORDS AVAILABLE.—April 13, 1913, to September 30, 1915.

GAGE.—Stevens water-stage recorder on left bank, April 24, 1914, to September 30, 1915; vertical staff on county bridge, in the SW. ¼ sec. 22, T. 17 S., R. 7 W., April 13, 1913, to April 23, 1914; datum of vertical staff raised 0.15 foot December 19, 1913.

DISCHARGE MEASUREMENTS.—Made from county bridge or by wading.

CHANNEL AND CONTROL.—Bed composed of sand; shifts occasionally. Two channels at extreme high water; some vegetation in channel.

EXTREMES OF DISCHARGE.—Maximum stage recorded during year, 7.97 feet at 7.30 p. m., March 24 (discharge, 1,041 second-feet); minimum stage, 1.55 feet from 11 a. m. to 6 p. m. September 16 (discharge, 13.5 second feet).

1912–1915: Maximum stage recorded, 9.45 feet, June 12, 1914 (discharge, 1,580 second-feet); minimum stage, 2.0 feet May 13–19, 1912 (discharge, 0.5 second-foot).

WINTER FLOW.—Stage-discharge relation at times affected by ice.

DIVERSIONS.—Numerous diversions above station take practically entire flow during irrigation season; water passing gage at such time is largely seepage or return water entering below Gunnison Bend reservoir.

REGULATION.—Flow controlled by storage reservoirs and diversion dams above station.

ACCURACY.—Records good.

COOPERATION.—Some discharge measurements furnished by lower Sevier River Water Users.

Discharge measurements of Sevier River at Oasis, Utah, during the year ending Sept. 30, 1915.

Date.	Made by—	Gage height.	Discharge.	Date.	Made by—	Gage height.	Discharge.
		Feet.	*Sec.-ft.*			*Feet.*	*Sec.-ft.*
Oct. 11	R. W. Davenport	3.85	196	July 3	J. W. Thurston	1.70	17.7
Nov. 21	J. J. Sanford	3.55	160	16	.....do	1.74	19.2
Feb. 6	Lynn Crandall	2.86	87	30	L. W. Jordan	1.74	18.4
Mar. 12	L. W. Jordan	2.54	62	Aug. 21	Lynn Crandall	1.66	15.4
May 2	J. C. Dort	3.72	174	Sept. 7	J. C. Dort	1.70	17
June 5	J. W. Thurston	2.33	38				

Daily discharge, in second-feet of Sevier River at Oasis, Utah, for the year ending Sept. 30, 1915.

Day.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.
1	637	127	130	61	76	87	865	126	405	18	19	18
2	532	155	130	61	81	84	865	119	132	17	19	18
3	454	151	140	64	86	80	806	212	79	18	20	18
4	400	149	150	61	88	78	748	184	49	18	18	18
5	300	145	140	64	88	76	437	101	40	18	18	17
6	200	140	129	63	86	75	97	82	33	17	18	16
7	200	135	109	66	84	73	112	115	25	16	18	18
8	200	130	98	66	83	70	106	85	23	16	18	20
9	200	127	96	64	82	69	164	32	23	16	18	20
10	200	130	94	69	82	70	96	31	23	17	17	17
11	198	130	92	66	122	70	89	29	23	17	18	16
12	186	130	90	67	131	66	84	24	21	20	18	16
13	153	130	88	67	129	66	79	21	22	22	17	17
14	134	130	83	68	127	66	71	22	22	22	17	15
15	124	160	83	70	117	61	43	24	23	20	17	15
16	123	190	88	71	113	61	43	24	22	19	18	14
17	122	190	88	74	112	60	46	23	21	19	17	14
18	123	181	88	79	110	61	49	24	20	19	16	15
19	125	170	88	74	105	61	52	29	19	20	16	15
20	127	160	73	74	105	60	44	42	18	18	16	16
21	121	159	61	80	107	61	35	42	19	18	16	15
22	81	158	61	85	102	60	26	42	18	18	17	15
23	47	158	61	90	100	62	27	43	17	21	17	16
24	54	157	61	98	98	499	22	43	18	24	18	16
25	69	160	62	81	94	502	22	113	21	23	18	17
26	70	153	62	68	94	312	20	204	18	22	18	16
27	68	146	62	70	92	532	20	204	20	22	17	17
28	73	141	59	72	90	705	20	204	22	20	17	18
29	103	135	60	74	......	806	23	204	19	20	18	18
30	106	130	60	76	......	850	60	212	18	18	18	18
31	107	......	60	76	......	865	......	208	......	18	18	......

NOTE.—Discharge determined from two curves well defined below 200 second-feet, applicable Oct. 1 to Mar. 31, and Apr. 1 to Sept. 30 respectively. Clock stopped and discharge estimated from range of stage and comparison with records of Sevier River near Delta, considered in connection with fluctuations of Gunnison Bend reservoir, Oct. 4–10, Nov. 5–8, 10–17, 19–20, 23, 26–27, 30, Dec. 1–5, 9–11, 22–26, Jan. 21–23, 27–31, Apr. 17–18, 20–21.

Monthly discharge of Sevier River at Oasis, Utah, for the year ending Sept. 30, 1915.

Month.	Discharge in second-feet.			Run-off (total in acre-feet).	Accuracy.
	Maximum.	Minimum.	Mean.		
October	637	47	182	11,200	B.
November	190	127	148	8,810	C.
December	150	59	88.6	5,450	B.
January	98	61	71.6	4,400	B.
February	131	76	99.4	5,520	B.
March	865	60	214	13,200	B.
April	865	20	172	10,200	B.
May	212	21	92.5	5,690	B.
June	405	17	41.1	2,450	B.
July	24	16	19.1	1,170	B.
August	20	16	17.6	1,080	B.
September	20	14	16.6	988	B.
The year	865	14	96.9	70,200	

EAST FORK OF SEVIER RIVER AT COYOTO, UTAH.

LOCATION.—In the NW. ¼ sec. 15, T. 31 S., R. 2 W., immediately below mouth of Coyoto Creek, half a mile below diversion to Otter Creek reservoir, about half a mile southeast of Coyoto schoolhouse, Garfield County.

RECORDS AVAILABLE.—December 7, 1914, to August 15, 1915.

Gage.—Vertical staff fastened to post on right bank March 12 to August 15, 1915; original gage vertical staff on left bank fastened to old bridge abutment just above present gage, to different datum.

Discharge measurements.—Made by wading near station.

Channel and control.—Bed composed of sand and gravel; shifting at high stages. One channel at all stages.

Extremes of discharge.—Maximum stage recorded during year, 2.45 feet at 4.05 p. m. May 15 (discharge, 385 second-feet); minimum stage, 0.70 foot June, July, and August (discharge, 2 second-feet).

Winter flow.—Stage-discharge relation not seriously affected by ice.

Diversions.—Canals divert for irrigation and storage above station.

Regulation.—None, other than by diversions above mentioned.

Accuracy.—Records fair.

Discharge measurements of East Fork of Sevier River at Coyoto, Utah, during the year ending Sept. 30, 1915.

Date.	Made by—	Gage height.	Discharge.	Date.	Made by—	Gage height.	Discharge.
		Feet.	*Sec.-ft.*			*Feet.*	*Sec.-ft.*
Dec. 8	J. J. Sanford	1.08	5.6	June 1	J. J. Sanford	1.30	35
Jan. 17	.....do	.96	2.2	18	.....do	.68	1.9
Mar. 12	.....do	1.00	5.1	July 3	.....do	.70	[a] 2.0
Apr. 27	.....do	1.45	36.1	15	Porter and Sanford	.70	2.1
May 16	.....do	2.35	344				

[a] Discharge estimated.

Daily discharge, in second-feet, of East Fork of Sevier River at Coyoto, Utah, for the year ending Sept. 30, 1915.

Day.	Dec.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.
1	....	3.2	3.2	5.1	2.0	43	40	2.0	2.0
2	....	3.2	3.2	5.1	2.5	60	46	2.0	2.0
3	....	3.2	2.1	4.0	3.0	60	40	2.0	2.0
4	....	3.2	2.1	4.0	7.3	70	40	2.0	2.0
5	....	3.2	3.2	5.1	9.5	70	35	2.0	2.0
6	....	3.2	3.2	5.1	18	80	30	2.0	2.0
7	....	3.2	4.7	5.1	26	118	25	2.0	2.0
8	5.6	3.2	4.7	7.3	14	164	20	2.0	2.0
9	5.6	3.2	3.2	7.3	20	182	15	2.0	2.0
10	5.6	3.2	3.2	7.3	21	200	10	2.0	2.0
11	5.6	3.2	4.7	5.1	26	248	5.0	2.0	2.0
12	5.3	3.2	4.7	4.9	219	290	2.0	2.0	2.0
13	5.3	3.2	3.8	4.7	238	340	2.0	2.0	2.0
14	4.7	3.2	4.4	5.1	219	355	2.0	2.0	2.0
15	4.7	3.2	4.6	5.1	219	385	2.0	2.0	2.0
16	4.7	3.2	4.4	5.1	200	372	2.0	2.0	....
17	3.2	2.8	4.6	5.1	182	364	2.0	2.0	....
18	3.2	3.2	4.0	5.1	182	364	2.0	2.0	....
19	4.7	3.2	4.0	5.1	182	344	2.0	2.0	....
20	4.7	3.2	5.1	5.1	238	304	2.0	2.0	....
21	5.6	3.2	5.1	5.1	238	264	2.0	2.0	....
22	3.2	3.2	4.0	4.0	219	206	2.0	2.0	....
23	4.7	3.2	4.7	4.0	219	206	2.0	2.0	....
24	4.7	3.2	4.7	3.0	30	170	2.0	2.0	....
25	4.7	3.2	4.0	3.0	30	136	2.0	2.0	....
26	5.6	4.7	4.0	3.0	30	122	2.0	2.0	....
27	3.2	4.7	5.1	2.5	36	107	2.0	2.0	....
28	3.2	4.7	5.1	2.5	43	107	2.0	2.0	....
29	3.2	3.2	....	2.0	43	94	2.0	2.0	....
30	3.2	3.2	....	2.0	52	82	2.0	2.0	....
31	3.2	4.7	....	2.0	....	82	....	2.0	....

Note.—Discharge determined from three rather poorly defined curves applicable Dec. 8 to Feb. 12, Feb. 13 to May 10, and May 15 to Aug. 15, respectively. No observations June 6-12, owing to sand washing around gage; discharge interpolated.

Monthly discharge of East Fork of Sevier River at Coyoto, Utah, for the year ending Sept. 30, 1915.

Month.	Discharge in second-feet.			Run-off (total in acre-feet).	Accuracy.
	Maximum.	Minimum.	Mean.		
December 7-31	5.6	3.2	4.48	218	C.
January	4.7	2.8	3.33	206	C.
February	5.1	2.1	4.06	225	C.
March	7.3	2.0	4.48	275	C.
April	238	2.0	98.9	5,880	B.
May	385	43	193	11,900	B.
June	46	2.0	11.5	684	C.
July	2.0	2.0	2.0	123	C.
August 1-15	2.0	2.0	2.0	60	C.
The period				19,600	

EAST FORK OF SEVIER RIVER NEAR KINGSTON, UTAH.

LOCATION.—In the SW. ¼ sec. 13, T. 30 S., R. 3 W., about a mile below highway bridge and 2 miles east of Kingston, Piute County.

DRAINAGE AREA.—1,260 square miles (measured on topographic maps).

RECORDS AVAILABLE.—April 29, 1914, to September 30, 1915. Records obtained about 1½ miles above Rockyford Bridge, in the SW. ¼ sec. 16, T. 30 S., R. 2½ W., March 27, 1913, to April 28, 1914; also at gage three-fourths mile north of Kingston, in the NE. ¼ sec. 10, T. 30 S., R. 3 W., May 11 to September 20, 1912.

GAGE.—Stevens water-stage recorder on right bank, a mile below highway bridge, April 24, 1914, to September 30, 1915; vertical staff 1½ miles above bridge March 27, 1913, to April 28, 1914.

DISCHARGE MEASUREMENTS.—Made from highway bridge or by wading.

CHANNEL AND CONTROL.—Bed composed of gravel, shifts during floods; one channel at medium and low stages; right bank overflows at high water.

EXTREMES OF DISCHARGE.—Maximum stage recorded during year, 4.33 feet at 4.30 p. m. May 14 (discharge, 578 second-feet); minimum stage, 2.42 feet at 9 a. m. February 23 (discharge, 15 second-feet).

1913–1915: Maximum stage recorded, 4.33 feet May 14, 1915 (discharge, 578 second-feet); minimum stage, 1.0 foot September 19, 20, and 21, 1913 (discharge, 8 second-feet).

WINTER FLOW.—Stage-discharge relation seriously affected by ice; flow determined from discharge measurements.

DIVERSIONS.—Present station above all diversions in vicinity of Kingston; original site below all diversions.

REGULATION.—Flow affected by operation of gates in the Otter Creek reservoir dam 8 miles above.

ACCURACY.—Records fair.

Discharge measurements of East Fork of Sevier River near Kingston, Utah, during the year ending Sept. 30, 1915.

Date.	Made by—	Gage height.	Discharge.	Date.	Made by—	Gage height.	Discharge.
		Feet.	*Sec.-ft.*			*Feet.*	*Sec.-ft.*
Oct. 20	J. J. Sanford	2.62	23.2	July 3	J. J. Sanford	3.94	368
Dec. 9	do	2.70	30.6	16	Porter and Sanford	3.92	382
Jan. 13	do	[a] 3.32	13.3	29	J. J. Sanford	3.94	370
Mar. 12	do	2.53	23.2	Aug. 10	do	3.96	379
Apr. 27	do	2.93	64	25	do	3.70	242
May 16	do	3.96	424	Sept. 6	do	3.68	241
June 1	do	3.40	162	20	do	3.42	155
18	do	2.58	31				

[a] Stage-discharge relation affected by ice.

Daily discharge, in second-feet, of East Fork of Sevier River near Kingston, Utah, for the year ending Sept. 30, 1915.

Day.	Oct.	Nov.	Dec.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.
1	34	28	23		23	61	187	171	366	366	246
2	38	28	23		23	198	158	165	362	370	246
3	38	26	23		23	198	125	162	366	378	254
4	39	28	23		22	209	118	174	366	374	250
5	30	26	23		23	213	131	165	370	374	246
6	29	32	22		23	217	152	160	362	374	242
7	30	30	23		22	213	155	150	362	370	242
8	31	28	28		23	213	149	138	358	366	246
9	31	28	24		23	217	155	133	358	374	246
10	30	28			23	213	171	128	366	374	242
11	29	28			23	202	206	110	362	378	246
12	29	28			23	73	274	53	362	378	260
13	29	28			25	165	370	45	358	370	246
14	29	26			28	194	462	45	362	366	246
15	27	25			37	194	444	46	362	366	222
16	27	27			38	187	444	44	362	370	162
17	27	27			32	177	394	36	362	374	159
18	27	26			30	184	345	33	362	360	159
19	27				28	198	263	32	362	349	159
20	26			22	28	202	190	31	366	267	159
21	25			21	27	213	158	31	366	250	165
22	27			21	27	213	131	38	366	250	162
23	27			21	28	209	92	242	370	250	156
24	27			21	30	191	110	290	374	246	153
25	27			20	30	96	125	298	374	246	150
26	28			21	30	80	105	298	370	250	156
27	28	23		22	29	64	92	294	366	250	153
28	28	21		22	28	65	146	306	366	250	142
29	28	23			27	115	168	346	366	246	61
30	28	23			27	187	162	362	374	246	35
31	28				27		177		370	254	

NOTE.—Discharge determined from three curves well defined above and fairly well defined below 100 second-feet, applicable Oct. 1 to May 16, May 21 to Aug. 17, and Aug. 21 to Sept. 30, respectively. Mean flow estimated because of ice Nov. 19–26, 24 second-feet; Dec. 2–3, 23 second-feet; Dec. 10–31, 21 second-feet; Jan. 1–31, 20 second-feet; Feb. 1–19, 22 second-feet; and by indirect method for shifting control May 17–20.

Monthly discharge of East Fork of Sevier River near Kingston, Utah, for the year ending Sept. 30, 1915.

Month.	Discharge in second-feet.			Run-off (total in acre-feet).	Accuracy.
	Maximum.	Minimum.	Mean.		
October	39	25	29.3	1,800	B.
November	32		26.0	1,550	B.
December			[a] 21.6	1,330	C.
January			[a] 20.0	1,230	D.
February			[a] 21.8	1,210	D.
March	38	22	26.8	1,650	B.
April	217	61	172	10,200	A.
May	462	92	205	12,600	B.
June	362	31	151	8,980	A.
July	374	358	365	22,400	A.
August	378	246	324	19,900	A.
September	254	35	193	11,500	B.
The year	462		130	94,400	

[a] Estimated.

OTTER CREEK ABOVE RESERVOIR NEAR COYOTO, UTAH.

LOCATION.—In sec. 25, T. 29 S., R. 2 W., about three-fourths mile above Otter Creek reservoir.

DRAINAGE AREA.—Not measured.

RECORDS AVAILABLE.—January 17 to August 10, 1915.

GAGE.—Vertical staff on right bank.

DISCHARGE MEASUREMENTS.—Made by wading near gage.

CHANNEL AND CONTROL.—Bed composed of sand and gravel; shifting. One channel at all stages.

Extremes of discharge.—Maximum stage recorded during year, 3.7 feet at 10 a. m. March 25 (discharge, 78 second-feet); stream dry May 29, June 13, and August 10.

Winter flow.—Stage-discharge relation affected by ice.

Diversions.—Canals divert for irrigation upstream.

Regulation.—One reservoir storing water for irrigation upstream. Capacity unknown.

Accuracy.—Records fair.

Discharge measurements of Otter Creek above reservoir near Coyoto, Utah, during the year ending Sept. 30, 1915.

[Made by J. J. Sanford.]

Date.	Gage height.	Discharge.	Date.	Gage height.	Discharge.	Date.	Gage height.	Discharge.
	Feet.	*Sec.-ft.*		*Feet.*	*Sec.-ft.*		*Feet.*	*Sec.-ft.*
Jan. 17	[a] 3.02	15.7	Apr. 27	1.46	18.8	June 1	1.20	4.9
Mar. 11	2.48	45	May 16	1.48	21.4	18	.60	[b] .7

[a] Relation of gage height to discharge affected by ice.

[b] Discharge estimated.

Daily discharge in second-feet of Otter Creek above reservoir near Coyoto, Utah, for year ending Sept. 30, 1915.

Day.	Mar.	Apr.	May.	June.	Day.	Mar.	Apr.	May.	June.
1		65	33	3.2	16	62	30	18	4.7
2		63	38	2.4	17	59	28	14	.7
3		60	40	10	18	67	29	12	1.5
4		61	44	11	19	65	32	47	1.8
5		62	42	9.2	20	65	33	20	
6		60	56	7.0	21	64	30	20	
7	34	60	66	5.3	22	70	30	21	
8	49	61	36	4.5	23	75	31	21	
9	44	63	35	4.9	24	77	32	20	
10	44	61	22	6.8	25	78	30	19	
11	42	53	28	2.6	26	67	24	15	
12	44	43	24	.7	27	73	19	12	
13	43	36	22	0	28	70	17	9	
14	45	31	19	4.7	29	66	19	0	
15	48	30	18	2.6	30	64	33	2.0	
					31	67		1.5	

Note.—Discharge determined from a fairly well-defined rating curve. Discharge May 30 to June 9, estimated from rating curve through one measurement made while temporary dam obstructed the control. Mean flow estimated because of ice, Jan. 17–31, 16 second-feet; Feb. 1–28, 18 second-feet; Mar. 1–6, 25 second-feet; and because of changes in stream bed, June 20–30, 0.7 second-foot; July 1–31, 0.5 second-foot; Aug. 1–9, 0.2 second-foot.

Monthly discharge of Otter Creek above reservoir near Coyoto, Utah, for the year ending Sept. 30, 1915.

Month.	Discharge in second-feet.			Run-off (total in acre-feet).	Accuracy.
	Maximum.	Minimum.	Mean.		
January 17–31			[a] 16	476	C.
February			[a] 18	1,000	D.
March	78		52.6	3,230	B.
April	65	17	40.8	2,430	B.
May	66	0	24.8	1,520	B.
June	11	0	3.04	181	D.
July			[a] .5	31	D.
August 1–9			[a] .2	4	D.
The period				8,870	

[a] Estimated.

OTTER CREEK NEAR COYOTO, UTAH.

Location.—In the W. ½ sec. 28, T. 30 S., R. 2 W., just below outlet of Otter Creek reservoir, 5 miles northwest of Coyoto, Garfield County, and about 12 miles east of Kingston.

Drainage area.—Indeterminate; 400 square miles of Otter Creek basin is tributary to reservoir; the reservoir also receives water from East Fork of Sevier River.

Records available.—June 21 to September 12, 1913; May 28 to September 21, 1914; March 12 to September 28, 1915.

Gage.—Stevens water-stage recorder on left bank, with outside staff gage.

Discharge measurements.—Made by wading just below gage.

Channel and control.—Bed composed of gravel. Broad-crested concrete weir just below gage serves as permanent control. One channel at all stages.

Winter flow.—Gates of reservoir are usually closed after irrigation season, allowing only a small amount of seepage—approximately 2 second-feet—to pass the station.

Diversions.—Some diversions for irrigation above reservoir.

Regulation.—Flow past station controlled by operation of outlet gates of reservoir just above.

Accuracy.—Records excellent.

Discharge measurements of Otter Creek near Coyoto, Utah, during the year ending Sept. 30, 1915.

[Made by J. J. Sanford.

Date.	Gage height.	Discharge.	Date.	Gage height.	Discharge.	Date.	Gage height.	Discharge.
	Feet.	*Sec.-ft.*		*Feet.*	*Sec.-ft.*		*Feet.*	*Sec.-ft.*
Mar. 12	0.26	[a]4.7	July 29	2.61	376	Sept. 20	1.56	155
June 1	1.23	102	Aug. 26	2.02	247			

[a] Measurement made below mouth of seepage slough just below gage; measured as 8.3 second-feet and seepage deducted to give discharge past gage.

Daily discharge, in second feet, of Otter Creek near Coyoto, Utah, for the year ending Sept. 30, 1915.

Day.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.
1	....	89	2	100	381	361	250
2	....	187	2	99	376	365	248
3	....	187	3	107	374	367	254
4	....	187	7	111	370	367	250
5	....	187	7	110	367	365	246
6	....	186	7	110	365	365	248
7	....	185	7	108	363	365	250
8	....	185	7	105	363	370	254
9	....	185	7	102	374	374	260
10	....	185	7	97	374	370	248
11	....	133	8	65	372	367	250
12	5	10	9	24	370	365	246
13	5	9	10	24	372	365	240
14	5	7	9	24	376	365	238
15	5	8	10	24	374	363	189
16	6	10	10	20	374	363	154
17	6	10	12	12	374	361	152
18	6	10	13	11	376	356	148
19	6	10	13	11	378	297	146
20	7	10	13	12	376	244	152
21	7	10	15	12	383	248	154
22	7	10	15	136	363	246	152
23	7	10	15	294	381	242	148
24	7	5	15	298	376	242	144
25	7	2	15	296	372	246	144
26	7	2	15	296	374	250	158
27	7	2	26	294	376	248	152
28	7	2	70	341	372	246	73
29	7	2	70	381	372	246	2
30	7	2	83	385	370	252	2
31	8	....	102	....	365	252	....

NOTE.—Discharge determined from a very well defined curve. Gage not working Apr. 19 to May 2 owing to construction work on new gage house and discharge has been estimated by comparison with Kingston record and observer's notes. Head gates at dam closed down Sept. 28 and discharge estimated Sept. 29-30.

Monthly discharge of Otter Creek near Coyoto, Utah, for the year ending Sept. 30, 1915.

Month.	Discharge in second-feet.			Run-off (total in acre-feet).	Accuracy.
	Maximum.	Minimum.	Mean.		
March 12-31	8	5	6.45	256	B.
April	187	2	67.5	4,020	A.
May	102	2	19.5	1,200	A.
June	385	11	134	7,970	A.
July	383	363	373	22,900	A.
August	374	242	317	19,500	A.
September	254	2	185	11,000	A.
The period	....	....	....	66,800	

CLEAR CREEK AT SEVIER, UTAH.

LOCATION.—In the SE. ¼ sec. 32, T. 25 S., R. 4 W., at the town of Sevier, Sevier County, about 100 yards above Sevier River. Dry Creek enters from the right about 2½ miles above and Mill Creek about 8 miles above station.

DRAINAGE AREA.—150 square miles (measured on topographic maps).

RECORDS AVAILABLE.—February 23, 1912, to September 30, 1915.

GAGE.—Stevens water-stage recorder on right bank, April 4, 1914, to September 30, 1915; vertical staff at same site February 23, 1912, to April 3, 1914; both gages at same datum.

DISCHARGE MEASUREMENTS.—Made by wading or from log bridge just above gage.

Channel and control.—Bed composed of sand and gravel. Concrete cut-off wall, installed just below gage August 31, 1914, serves as permanent control. One channel at all stages.

Extremes of discharge.—Maximum stage recorded during year, 2.26 feet at 5 p. m. June 2 (discharge, 138 second-feet); minimum stage 0.73 foot, August 29–30 (discharge, 2 second-feet).

1912–1915: Maximum discharge recorded, 3.15 feet May 24, 1914 (discharge, 240 second-feet); stream dry August 26, 1913.

Winter flow.—Stage-discharge relation affected by ice occasionally for short periods.

Diversions.—Cove canal heads about three-fourths mile above station.

Regulation.—None.

Accuracy.—Records good.

Discharge measurements of Clear Creek at Sevier, Utah, during the year ending Sept. 30, 1915.

Date.	Made by—	Gage height.	Discharge.	Date.	Made by—	Gage height.	Discharge.
		Feet.	*Sec.-ft.*			*Feet.*	*Sec.-ft.*
Oct. 24	J. J. Sanford	1.00	8.0	June 8	.....do	1.82	78
Dec. 11	.....do	1.00	8.7	12	.....do	1.99	104
Jan. 13	.....do	1.12	14.2	28	.....do	1.64	59
Mar. 6	.....do	1.14	15	July 6	.....do	1.52	49.4
Apr. 25	.....do	1.14	18	13	Porter and Sanford	1.14	18
May 13	.....do	1.58	54	26	J. J. Sanford	1.15	18.4
13	.....do	1.58	57	Aug. 9	.....do	.84	3.9
26	.....do	1.89	94				

Daily discharge, in second feet, of Clear Creek at Sevier, Utah, for the year ending Sept. 30, 1915.

Day.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.
1	3	6	3	12	16	16	19	31	85	45	8	3
2	3	4	5	12	16	14	25	25	104	41	7	3
3	3	5	8	13	16	15	32	20	108	37	6	4
4	4	5	8	16	16	13	35	20	98	40	6	5
5	5	5	8	16	13	16	35	20	85	43	4	6
6	5	5	8	15	13	15	32	24	76	46	4	7
7	5	5	8	18	16	15	29	26	72	43	5	8
8	5	4	8	16	14	14	35	28	79	34	4	7
9	7	4	7	18	16	16	28	29	90	25	4	7
10	7	4	7	17	17	16	24	32	100	22	4	7
11	9	4	8	14	18	16	26	36	108	22	4	7
12	9	4	8	17	18	16	27	41	102	20	3	6
13	9	4	9	16	17	16	26	55	90	16	3	6
14	8	3	9	16	15	16	24	67	79	12	3	7
15	8	3	9	16	14	17	16	69	70	10	3	7
16	8	3	10	16	19	19	16	69	69	8	3	7
17	7	3	12	12	18	18	16	82	68	7	3	7
18	7	3	14	14	17	19	17	114	70	10	3	7
19	7	3	16	15	17	17	18	93	73	8	3	6
20	7	3	16	14	17	17	19	112	78	8	3	6
21	7	3	15	13	17	16	20	114	74	8	3	6
22	8	3	12	12	17	17	19	98	70	8	3	6
23	8	3	13	11	16	19	15	92	76	10	2	6
24	8	3	12	12	16	21	14	87	73	15	2	5
25	8	3	12	14	16	24	14	104	66	13	2	5
26	6	3	13	14	16	23	13	90	68	17	2	5
27	5	3	13	14	16	20	16	90	62	16	2	5
28	6	3	13	16	14	14	18	86	59	16	2	5
29	5	3	12	17	......	15	31	82	53	13	2	5
30	6	3	12	17	......	14	38	80	49	12	2	6
31	7	......	12	17	......	16	......	81	......	10	2	......

Note.—Discharge determined from a fairly well defined rating curve. Interpolated June 30, July 1–2, 4–5, Aug. 10–13.

Monthly discharge of Clear Creek at Sevier, Utah, for the year ending Sept. 30, 1915.

Month.	Discharge in second-feet.			Run-off (total in acre-feet).	Accuracy.
	Maximum.	Minimum.	Mean.		
October	9	3	6.45	397	C.
November	6	3	3.67	218	C.
December	16	3	10.3	633	C.
January	18	11	14.8	910	B.
February	19	13	16.1	894	B.
March	24	13	16.8	1,030	B.
April	38	13	23.2	1,380	B.
May	114	20	64.4	3,960	A.
June	108	49	78.5	4,670	A.
July	46	7	20.5	1,260	B.
August	8	2	3.45	212	D.
September	8	3	5.90	351	D.
The year	114	2	22.0	15,900	

SALINA CREEK AT SALINA, UTAH.

Location.—In the NW. ¼ sec. 25, T. 21 S., R. 1 W., at bridge south of hotel at Salina, Sevier County, about a mile above confluence with Sevier River.

Drianage area.—298 square miles (measured on topographic maps).

Records available.—April 25, 1914, to September 30, 1915. July 1 to December 31, 1900, at vertical staff gage about 5 miles southeast of Salina.

Gage.—March 23 to September 30, 1915, vertical staff nailed to right bridge abutment a quarter of a mile south of hotel; April 25, 1914, to March 22, 1915, vertical staff nailed to right abutment of bridge on depot road in SE. ¼ sec. 23.

Discharge measurements.—Made from highway bridge or by wading.

Channel and control.—Bed composed of gravel; shifts during extreme high water.

Extremes of discharge.—Maximum stage recorded during year, 2.6 feet at 8.30 a. m. May 17 (discharge, 176 second-feet) dry part of year.

1914–15: Maximum stage recorded, 5.20 feet May 22, 1914 (discharge, 270 second-feet); minimum zero flow.

Winter flow.—Stage-discharge relation seriously affected by ice. Observations discontinued.

Diversion.—Below all diversions.

Regulation.—Not known.

Accuracy.—Records fair.

Discharge measurements of Salina Creek at Salina, Utah, during the year ending Sept. 30, 1915.

Date.	Made by—	Gage height.	Discharge.	Date.	Made by—	Gage height.	Discharge.
		Feet.	*Sec.-ft.*			*Feet.*	*Sec.-ft.*
Oct. 28	J. J. Sanford	2.25	[a] 2.0	June 1	J. C. Dort	2.04	82.2
Jan. 22	do		5.9	11	J. J. Sanford	1.55	30.4
Mar. 23	do	.86	5.4	July 8	Porter and Dort	.82	[a] 1.8
May 6	J. C. Dort	1.12	11.2	Sept. 13	J. C. Dort	.64	.1

[a] Discharge estimated.

Daily discharge, in second-feet, of Salina Creek at Salina, Utah, for year ending Sept. 30, 1915.

Day.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.
1		15	7.0	91	3.0	0.3	0.3
2		37	8.9	70	1.5	.3	1.0
3		19	11	70	1.0	.3	1.0
4		42	12	73	1.0	.3	1.5
5		58	11	78	1.5	.3	.6
6		63	11	70	1.2	.3	.3
7		46	11	73	1.0	.3	.3
8		78	9.2	51	.7	.3	.3
9		11	11	40	.8	.3	0
10		27	12	35	.6	.3	0
11		17	12	33	0	.3	.3
12		14	12	20	0	.3	.3
13		16	47	9.5	0	0	.2
14		10	38	7.0	.6	0	.3
15		6.8	57	6.0	1.5	0	.3
16		9.2	70	6.0	.6	.6	.3
17		9.2	120	6.0	1.5	.3	.3
18		21	98	5.0	.3	.3	.3
19		32	119	5.2	.3	.3	.3
20		20	77	5.2	.3	.3	.3
21		13	106	5.2	.6	.3	.3
22		9.2	81	4.5	1.5	.3	.3
23	5.1	8.3	84	4.5	.3	.3	.6
24	8.3	7.8	98	6.0	1.0	.0	.3
25	11	7.6	74	4.5	.3	.0	.3
26	14	8.9	83	1.0	.6	.3	.3
27	13	11	63	5.2	.3	.3	.3
28	17	13	73	4.5	.3	.3	.3
29	14	64	80	3.9	1.0	0	.3
30	14	40	84	4.5	.3	0	.3
31	10		97		0	0	

NOTE.—Discharge determined from two fairly well defined curves, one applicable Mar. 23 to July 1, the other July 2 to Sept. 30. Shift caused by small dam placed across stream.

Monthly discharge of Salina Creek at Salina, Utah, for the year ending Sept. 30, 1915.

Month.	Discharge in second-feet.			Run-off (total in acre-feet).	Accuracy.
	Maximum.	Minimum.	Mean.		
March 23–31	17	5.1	11.8	211	C.
April	78	6.8	24.5	1,460	B.
May	120	7.0	54.1	3,330	B.
June	91	1.0	26.6	1,580	B.
July	3	.0	.76	47	C.
August	.6	.0	.23	14	C.
September	1.5	.0	.38	23	C.
The period				6,660	

SAN PITCH RIVER NEAR GUNNISON, UTAH.

LOCATION.—In the NW. ¼ SW. ¼ sec. 18, T. 19 S., R. 1 W., about one-fifth mile below a small diversion dam, half a mile above confluence with Sevier River, and 3 miles west of Gunnison, Sanpete County.

DRAINAGE AREA.—886 square miles (measured on topographic maps).

RECORDS AVAILABLE.—February 21, 1912, to September 30, 1915; June 30, 1900, to December 31, 1905, at a point about 4 miles northeast of Gunnison.

GAGE.—Stevens water-stage recorder on right bank, at new datum, May 18, 1914, to September 30, 1915; vertical staff on left bank, about one-fifth mile below small diversion dam, February 21, 1912, to May 17, 1914.

DISCHARGE MEASUREMENT.—Made from cable about 10 feet below gage, from bridge just below gage, or by wading.

CHANNEL AND CONTROL.—Bed composed of sand and gravel; shifting. Right bank high; left bank low and subject to overflow.

EXTREMES OF DISCHARGE.—Maximum stage recorded during year, 3.85 feet at 3.30 a. m. March 22 (discharge, 608 second-feet); minimum stage, 1.58 feet at 3 a. m. December 8 (discharge, 1.3 second-feet).

1912–1915: Maximum discharge, 608 second-feet, March 22, 1915; minimum discharge, 0.1 second-foot, June 20–24, July 1–6, 1912.

WINTER FLOW.—Stage-discharge relation seriously affected by ice; flow determined from discharge measurements, observer's notes, and records of precipitation and temperature. Ice forms in layers because of alternate freezing and flooding, and the water flows between. Records roughly approximate.

DIVERSIONS.—In years of normal flow practically all the water of this stream is used for irrigation in the San Pete Valley and in the vicinity of Gunnison. Winter and spring run-off is stored in the Gunnison reservoir, about 7 miles above Gunnison. At times part of the water flowing past the gage is waste from the Kearns-Robbins (Fayette) canal (diverting from Sevier River), which crosses the San Pitch about half a mile above gage.

REGULATION.—Flow controlled by Gunnison reservoir. See Diversions.

ACCURACY.—Records considered fair from March to November; winter records roughly approximate owing to effects of ice and unreliable gage-height record.

Discharge measurements of San Pitch River near Gunnison, Utah, during the year ending Sept. 30, 1915.

Date.	Made by—	Gage height.	Discharge.	Date.	Made by—	Gage height.	Discharge.
		Feet.	*Sec.-ft.*			*Feet.*	*Sec.-ft.*
Oct. 6	R. W. Davenport	2.02	21.5	Apr. 22	J. C. Dort	1.40	3.0
Dec. 12[a]	J. J. Sanford	1.72	5.2	May 7	do	1.52	7.2
Jan. 26[b]	do	3.46	19	June 2	do	1.54	6.8
Feb. 9[b]	E. A. Porter	3.3	12.5	26	do	1.30	[c]2.5
Mar. 6	L. W. Jordan	2.12	29.1	July 8	Porter and Dort	1.22	[c]1.3
22	J. J. Sanford	3.73	554				

[a] Some ice in stream. [b] Stage-discharge relation affected by ice. [c] Discharge estimated.

Daily discharge, in second-feet, of San Pitch River near Gunnison, Utah, for the year ending Sept. 30, 1915.

Day.	Oct.	Nov.	Dec.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.
1	4.7	1.5	10	......	......	36	20	8.0	2.2	2.1	2.2
2	5.0	1.5	12	......	......	30	12	7.6	2.1	2.2	2.1
3	19	1.5	8.2	......	......	46	9.2	12	1.9	2.2	2.2
4	19	1.5	7.8	......	......	170	11	6.0	1.8	2.2	2.2
5	21	1.5	7.8	......	......	159	13	2.9	1.7	2.2	2.1
6	22	1.5	7.4	......	31	123	8.8	2.8	1.7	2.2	2.2
7	21	1.6	3.3	......	32	84	8.4	2.8	1.7	2.2	2.2
8	23	1.6	1.5	......	32	37	7.2	3.0	1.7	2.2	2.2
9	23	1.6	5.4	12	34	24	6.0	9.2	......	2.2	2.1
10	21	1.6	7.4	12	38	14	7.2	6.4	......	2.1	2.1
11	20	1.6	4.7	14	52	6.0	7.2	3.9	......	2.0	2.2
12	18	1.6	5.2	16	70	8.0	5.4	3.0	......	1.8	2.5
13	18	1.6	5.9	18	106	5.1	3.9	3.0	......	1.7	2.5
14	17	1.6	8.0	26	123	3.3	4.8	5.4	......	1.6	2.5
15	16	3.0	11	29	190	3.9	5.4	2.5	......	1.9	2.5
16	15	2.6	14	27	270	2.5	7.2	2.3	......	2.1	2.4
17	14	3.0	14	26	360	3.6	5.7	2.3	......	2.0	2.4
18	9.0	3.0	14	30	410	10	5.1	2.2	1.6	1.8	2.4
19	3.0	3.3	15	27	450	25	4.5	2.1	......	1.8	2.4
20	3.0	3.0	......	26	457	23	4.8	2.1	......	1.8	2.4
21	2.0	4.3	......	26	541	10	3.6	2.2	......	1.7	2.4
22	1.9	4.0	......	25	564	4.5	5.1	2.2	......	1.7	2.4
23	1.9	20	......	25	497	4.5	4.2	2.2	......	2.2	2.4
24	1.9	40	......	24	420	4.5	5.1	2.3	......	2.4	2.4
25	1.9	30	......	24	400	4.8	12	2.3	1.9	2.4	2.4
26	1.9	10	......	24	260	3.6	14	2.2	2.1	2.4	2.4
27	1.9	9.5	......	23	202	6.8	15	2.2	2.1	2.4	2.5
28	1.6	9.5	......	24	258	3.0	17	2.3	1.9	2.2	2.5
29	1.6	10	......	......	202	3.9	12	2.3	2.0	2.2	2.5
30	1.6	10	......	......	251	31	12	2.2	2.0	2.2	2.5
31	1.5	......	......	......	187	......	10	......	2.1	2.2	......

NOTE.—Discharge determined from two fairly well defined curves applicable Oct. 1 to Mar. 14 and Mar. 20 to Sept. 30, respectively. Stream frozen, discharge estimated as follows. Dec. 20–31, 15 second-feet; Jan. 1–31, 18 second-feet; Feb. 1–8, 14 second-feet; Dec. 12, 14–15, Feb. 9–13 as in table. Clock stopped and discharge estimated Feb. 20–22, 24–26, 28, Mar. 15–19, 24–26, as in table, by comparison with records on Sevier near Gunnison and Fayette, and Mar. 1–5, 27 second-feet; July 9-17, 1.6 second-feet; July 19–24, 1.8 second-feet, from range of stage indicated by automatic pencil.

Monthly discharge of San Pitch River near Gunnison, Utah, for the year ending Sept. 30, 1915.

Month.	Discharge in second-feet.			Run-off (total in acre-feet).	Accuracy.
	Maximum.	Minimum.	Mean.		
October	23	1.5	10.7	658	B.
November	40	1.5	6.23	371	B.
December	......	1.5	11.0	676	C.
January	......	......	[a] 18.0	1,110	D.
February	30	......	20.4	1,130	C.
March	564	......	212	13,000	C.
April	170	2.5	29.7	1,770	B.
May	20	3.6	8.61	529	B.
June	12	2.1	3.73	222	C.
July	......	......	1.80	111	C.
August	2.4	1.6	2.07	127	C.
September	2.5	2.1	2.34	139	
The year	564	1.5	27.4	19,800	

[a] Estimated.

BEAVER RIVER BASIN.

BEAVER RIVER NEAR BEAVER, UTAH.

LOCATION.—In the SE. ¼ sec. 13, T. 29 S., R. 7 W., half a mile above city diversion dam at mouth of canyon, 3 miles above Beaver, Beaver County.

DRAINAGE AREA.—82 square miles. (Measured on topographic maps.)

RECORDS AVAILABLE.—June 15 to September 26, 1906; March 15, 1914, to September 30, 1915.

Gage.—Stevens continuous water-stage recorder on right bank November 14, 1914, to September 30, 1915; Lietz recorder March 30 to November 13, 1914. Datum of recording gages 0.03 foot lower than that of old vertical staff gage at same site, used prior to March 30, 1914.

Discharge measurements.—Made from footbridge 70 feet above gage or by wading.

Channel and control.—Bed is composed of boulders and coarse gravel; fairly permanent. One channel; left bank overflows at extremely high stages.

Extremes of discharge.—Maximum stage recorded during year, 5.07 feet at 8.30 p. m. June 1 (discharge, 448 second-feet); minimum stage, 2.80 feet at 11 a. m. February 27 (discharge, 16 second-feet).

1914-15: Maximum stage recorded, 5.48 feet May 21, 1914 (discharge, 650 second-feet); minimum stage, 2.80 feet February 27, 1915 (discharge, 16 second-feet).

Winter flow.—Stage-discharge relation seriously affected by ice.

Diversions.—Above all irrigation diversions. Above the station is a small storage reservoir known as Cants Lake. Water is diverted by the Beaver River Power Co. but returned to the stream several miles above station.

Regulation.—Flow probably not affected by operation of Beaver River Power Co.'s plant, but is affected by the Cants Lake storage reservoir.

Accuracy.—Rating curve fairly well defined. Open water-records good.

Discharge measurements of Beaver River near Beaver, Utah, during the year ending Sept. 30, 1915.

[Made by Lynn Crandall.]

Date.	Gage height.	Discharge.	Date.	Gage height.	Dischareg.
	Feet.	*Sec.-ft.*		*Feet.*	*Sec.-ft.*
Nov. 23	2.84	19.5	May 18	4.31	217
Jan. 26	[a] 3.27	24.4	July 30	3.15	45.1

[a] Stage-discharge relation affected by ice.

Daily discharge, in second-feet, of Beaver River near Beaver, Utah, for the year ending Sept. 30, 1915.

Day.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.
1	36	39	27	26	25	22	31	115	350	98	48	30
2	39	39	27	25	24	22	36	102	326	93	48	29
3	40	38	31	25	22	23	44	96	257	86	46	48
4	52	37	30	26	24	22	46	90	218	86	46	45
5	42	38	29	25	22	22	50	87	190	85	45	28
6	42	38	29	25	22	22	47	85	190	78	43	29
7	44	38	24	25	20	22	46	82	207	74	45	20
8	44	35	26	24	20	21	51	87	236	74	42	24
9	47	34	......	24	21	21	55	90	279	73	38	28
10	42	34	......	24	21	21	62	101	290	71	38	28
11	44	33	......	24	22	22	70	125	273	72	38	28
12	43	33	......	23	22	22	76	156	229	75	37	29
13	46	33	......	22	22	22	86	207	196	76	35	30
14	42	24	......	22	22	24	80	241	183	71	36	30
15	38	10	......	22	23	25	73	254	177	68	39	29
16	38	33	......	......	25	28	74	276	175	65	39	30
17	38	34	......	......	25	27	82	270	173	66	39	29
18	42	16	......	......	25	28	87	224	175	70	37	31
19	43	16	......	......	24	27	96	190	170	68	35	31
20	42	16	......	......	24	27	108	171	163	66	34	30
21	39	16	......	......	23	28	107	156	156	63	30	31
22	40	16	......	......	22	29	99	151	151	62	29	32
23	43	28	......	......	24	33	92	171	145	63	32	33
24	40	26	......	......	24	35	88	198	140	62	35	34
25	42	28	......	......	23	34	91	213	134	60	31	33
26	42	28	......	......	22	35	99	202	128	72	30	32
27	42	28	......	......	20	35	111	205	119	67	31	26
28	40	29	......	23	21	36	124	236	117	60	30	26
29	39	29	......	23	......	36	145	276	107	49	28	24
30	39	26	......	24	......	35	131	296	103	51	28	23
31	38	......	......	24	......	34	......	305	......	50	28	......

NOTE.—Discharge determined from a fairly well defined rating curve. Discharge estimated on account of ice as follows: Dec. 9-31, 26 second-feet; Jan. 16-27, 22 second-feet; Jan. 5-7, 10-11, and Feb. 5-6, as in table.

Monthly discharge of Beaver River near Beaver, Utah, for the year ending Sept. 30, 1915.

Month.	Discharge in second-feet.			Run-off (total in acre-feet).	Accuracy.
	Maximum.	Minimum.	Mean.		
October	47	36	41.5	2,550	A.
November	39	10	29.1	1,730	B.
December	31	....	26.5	1,630	C.
January	26	....	19.4	1,190	C.
February	25	20	22.6	1,260	B.
March	36	21	27.1	1,670	B.
April	145	31	79.6	4,740	B.
May	305	82	176	10,800	A
June	359	103	192	11,400	A.
July	98	40	70.1	4,310	B.
August	48	28	36.8	2,260	A.
September	48	20	30.0	1,780	A.
The year	359	10	62.7	45,300	

BEAVER RIVER AT ADAMSVILLE, UTAH.

Location.—In the S. ½ sec. 30, T. 29 S., R. 8 W., 100 yards below highway bridge on road from Milford to Beaver, one-fourth mile above mouth of Indian Creek, and three-fourths mile south of Adamsville, Beaver County.

Drainage area.—272 square miles (measured on topographic maps).

Records available.—December 16, 1913, to September 30, 1915.

Gage.—Stevens continuous water-stage recorder on right bank, 5 feet below cable March 13, 1914, to September 30, 1915; Friez water-stage recorder at same site December 16, 1913, to March 12, 1914.

Discharge measurements.—Made from cable or by wading.

Channel and control.—Bed composed of fine gravel; shifting. Banks covered with willows; overflowed at extreme high stages.

Extremes of discharge.—Maximum stage recorded during year, 3.03 feet at 4 a. m. June 2 (discharge, 254 second-feet); minimum stage, 1.32 feet at 4 p. m. July 14 (discharge, 8.6 second-feet).

1914-15: Maximum stage recorded, 4.26 feet at 5 a. m. June 3, 1914 (discharge, 544 second-feet); minimum stage, 1.32 feet at 4 p. m. July 14, 1915 (discharge, 8.6 second-feet).

Winter flow.—Stage-discharge relation seriously affected by ice for short periods.

Diversions.—No diversions between the station and the storage reservoir of the Beaver County Irrigation Co. There are a number of canals above the station supplying the Adamsville and Beaver districts.

Regulation.—Low-water flow affected by irrigation diversions.

Accuracy.—Records poor owing to shifting control.

Discharge measurements of Beaver River at Adamsville, Utah, during the year ending Sept. 30, 1915.

Date.	Made by—	Gage height.	Discharge.	Date.	Made by—	Gage height.	Discharge.
		Feet.	*Sec.-ft.*			*Feet.*	*Sec.-ft.*
Nov. 24	Lynn Crandall	1.74	45.1	May 30	Lynn Crandall	2.80	210
Jan. 27	.....do	[a] 1.88	24.8	July 30	Crandall and Gilbert	1.80	33.4
May 19	.....do	2.53	179				

[a] Stream frozen over. Stage-discharge relation affected by ice.

Daily discharge, in second-feet, of Beaver River at Adamsville, Utah, for the year ending Sept. 30, 1915.

Day.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.
1	27	43	49	......	38	50	43	136	225	27	28	10
2	26	43	51	......	44	49	45	125	235	28	22	12
3	28	44	49	......	54	48	49	114	214	34	12	97
4	34	44	50	......	45	48	54	104	223	30	10	55
5	33	43	50	......	46	49	56	103	200	30	11	38
6	32	44	50	......	50	49	56	107	178	31	17	36
7	35	44	49	......	45	49	59	99	177	36	22	31
8	46	43	50	......	49	49	62	88	173	32	18	30
9	53	43	49	......	51	50	62	87	191	27	14	31
10	50	45	49	......	54	50	63	86	204	25	14	32
11	50	45	49	......	60	52	66	93	204	21	15	31
12	50	44	46	......	53	50	71	100	177	17	15	31
13	46	44	45	......	51	49	79	118	154	13	12	29
14	40	44	44	......	56	50	90	160	134	10	12	31
15	46	45	41	......	58	50	88	179	105	11	16	31
16	46	45	40	......	49	50	78	185	86	11	13	32
17	45	46	39	......	49	45	76	194	74	11	19	33
18	45	44	38	......	49	45	78	176	66	12	18	32
19	45	43	37	......	49	43	81	179	65	13	17	33
20	44	44	36	......	49	41	90	174	59	13	15	31
21	43	50	......	......	50	40	93	159	58	12	14	29
22	46	53	......	......	49	41	84	138	53	11	15	30
23	45	51	......	......	49	41	82	137	48	33	14	28
24	44	49	......	......	49	42	78	143	46	31	14	27
25	45	51	......	......	50	44	68	148	43	28	12	25
26	45	53	......	......	51	44	66	159	40	78	10	26
27	45	53	......	......	52	43	63	161	37	84	12	25
28	43	52	......	......	51	43	64	163	32	47	14	25
29	43	51	......	36	......	51	86	180	29	40	13	24
30	43	51	......	39	......	48	136	204	27	33	10	22
31	43	......	......	41	......	45	......	218	......	28	10	......

NOTE.—Discharge determined from four poorly defined rating curves applicable as follows: Oct. 1 to Apr. 1 and June 26 to July 22; Apr. 15 to May 19; May 23 to June 11; and July 24 to Sept. 30. Indirect method for shifting control used Apr. 2–14, May 20–22, June 12–25, and July 23. Flow estimated because of ice as follows: Daily discharge Dec. 9–20 and Jan. 29 and 30; mean flow Dec. 21–31, 32 second-feet; Jan. 1–15, 33 second-feet; and Jan. 16–28, 25 second-feet. Recording gage out of commission and discharge Feb. 18, 19, 25, 26, and 28 and Mar. 1, 2, 4, and 5 interpolated.

Monthly discharge of Beaver River at Adamsville, Utah, for the year ending Sept. 30, 1915.

Month.	Discharge in second-feet.			Run-off (total in acre-feet).	Accuracy.
	Maximum.	Minimum.	Mean.		
October	53	26	42.3	2,600	B.
November	53	43	46.5	2,770	B.
December	51	....	40.7	2,500	C.
January	....	....	30.2	1,860	C.
February	60	38	50.0	2,780	B.
March	52	40	46.7	2,870	B.
April	136	43	72.2	4,300	C.
May	218	86	142	8,730	B.
June	235	27	119	7,080	C.
July	78	10	27.6	1,700	C.
August	28	10	14.9	916	C.
September	97	10	31.5	1,870	C.
The year	235	10	55.0	40,000	

BEAVER RIVER AT ROCKYFORD DAM, NEAR MINERSVILLE, UTAH.

Location.—In the NE. ¼ sec. 11, T. 30 S., R 9 W., 1,000 feet below Rockyford dam and 4¼ miles above Minersville, Beaver County.

Drainage area.—512 square miles (measured on topographic maps).

Records available.—December 18, 1913, to September 30, 1915.

Gage.—Friez water-stage recorder on right bank.

Discharge measurements.—Made by wading or from bridge 800 feet above gage. There are a few springs between this bridge and gage.

Channel and control.—Bed composed of rocks and boulders. Rocks embedded in concrete, 15 feet below gage serve as control. One channel. Right bank high; left bank low. Stage of zero flow about 1.9 feet.

Extremes of discharge.—Maximum stage recorded during year, 4.49 feet at 4.30 p. m. July 12 (discharge, 202 second-feet); minimum stage, 1.93 feet October 25 (discharge, 1.3 second-feet).

1914–15: Maximum stage recorded, 5.37 feet June 6, 1914 (discharge, 366 second-feet); minimum stage, 1.68 feet March 19 and 20, 1914 (discharge, estimated, 0.3 second-foot).

Winter flow.—Stage-discharge relation not affected by ice.

Diversions.—None between dam and station.

Regulation.—Flow controlled by operation of gates at Rockyford dam.

Accuracy.—Records good, except for period in winter when gage was not in operation.

Discharge measurements of Beaver River at Rockyford dam, near Minersville, Utah, during the year ending Sept. 30, 1915.

[Made by Lynn Crandall.]

Date.	Gage height.	Discharge.	Date.	Gage height.	Discharge.
	Feet.	*Sec.-ft.*		*Feet.*	*Sec.-ft.*
Nov. 24[a]	2.66	14.5	May 19[c]	2.65	10.6
Jan. 27[b]	2.38	11.5	30[c]	3.81	98
May 19[c]	3.65	73			

[a] Made at gage; flow increased by opening gates at dam before beginning measurement.
[b] Made 20 feet below gage; some seepage between gage and measuring section.
[c] Made at highway bridge just below tunnel outlet 600 feet above gage.

Daily discharge, in second-feet, of Beaver River at Rockyford dam, near Minersville, Utah, for the year ending Sept. 30, 1915.

Day.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.
1	166	1.7	15	8	......	9	76	9	133	191	92	20
2	98	1.9	15	8	......	9	50	9	133	191	97	21
3	49	12	15	8	......	9	50	9	133	188	97	73
4	46	25	15	9	......	9	50	9	133	174	95	109
5	45	20	9	9	......	9	50	17	130	145	95	85
6	42	17	3	9	......	9	46	25	111	142	94	52
7	44	20	3	9	......	9	44	25	108	134	91	48
8	55	......	3	10	......	9	27	29	106	153	95	40
9	69	......	3	10	......	9	18	32	106	186	104	40
10	62	......	4	10	......	9	18	32	108	194	102	38
11	60	......	4	11	......	16	19	40	127	193	111	40
12	58	......	4	11	......	19	26	58	150	191	116	34
13	55	......	4	11	......	19	36	58	150	152	115	22
14	56	......	4	11	......	21	43	58	150	53	108	26
15	54	......	5	11	......	25	50	66	150	164	108	26
16	53	......	5	11	......	26	50	69	148	183	91	35
17	52	......	5	11	......	27	50	76	148	180	6	43
18	52	......	5	12	......	30	49	76	148	159	19	43
19	51	......	5	12	......	32	46	61	148	97	18	43
20	32	......	5	12	9	32	44	50	164	97	17	44
21	7	......	5	12	9	32	44	69	166	97	21	45
22	10	......	5	12	9	32	43	84	182	96	20	43
23	15	......	5	12	9	32	42	84	166	80	19	42
24	1.3	12	5	10	9	31	42	84	42	9	21	38
25	1.3	15	6	8	9	44	47	84	175	85	22	30
26	1.6	15	6	8	9	75	54	84	174	101	33	29
27	1.4	15	6	8	9	83	55	83	190	98	102	30
28	1.5	15	6	8	9	97	57	78	198	83	70	30
29	1.6	15	7	8	......	97	66	84	198	85	30	30
30	1.7	15	7	8	......	95	41	99	194	91	21	29
31	1.6	......	7	8	......	95	......	116	......	90	20	......

NOTE.—Discharge determined from a well-defined rating curve. Water-stage recorder not operating Nov. 8 to Feb. 19; discharge ascertained from discharge measurements and information furnished by observer regarding operation of outlet gates at dam, Nov. 8-23, 10 second-feet; Feb. 1-19, 9 second-feet; Nov. 24 to Jan. 31, as in table. Discharge determined from mean of hourly discharge Oct. 20-23, Nov. 3 and 5, Mar. 11 and 25, Apr. 1, 8, and 30, May 5, 11, 19, and 21, June 23 and 24, July 13, 14, 18, and 23, Aug. 16-18, 26, and 28, Sept. 3, 10, 12, 13, 16, and 26.

Monthly discharge of Beaver River at Rockyford dam, near Minersville, Utah, for the year ending Sept. 30, 1915.

Month.	Discharge in second-feet.			Run-off (total in acre-feet).	Accuracy.
	Maximum.	Minimum.	Mean.		
October	166	1.3	40.1	2,470	A.
November	25	1.7	12.0	714	C.
December	15	3	6.32	389	D.
January	12	8	9.84	605	D.
February	....	....	9.00	500	C.
March	97	9	33.9	2,080	A.
April	76	18	44.4	2,640	A.
May	116	9	56.7	3,490	A.
June	198	42	146	8,690	A.
July	194	9	132	8,120	A.
August	116	6	66.1	4,060	A.
September	109	20	40.9	2,430	A.
The year	198	1.3	49.9	36,200	

INDIAN CREEK AT ADAMSVILLE, UTAH.

LOCATION.—In sec. 30, T. 29 S., R. 8 W., at highway bridge just east of Adamsville, Beaver County, about three-fourths mile above confluence with Beaver River.

DRAINAGE AREA.—180 square miles (measured on topographic maps).

RECORDS AVAILABLE.—June 26 to August 31, 1906; March 16, 1914, to September 30, 1915.

GAGE.—Vertical staff nailed to left bridge abutment; read once daily by W. A. Rees.

DISCHARGE MEASUREMENTS.—Made by wading.

Channel and control.—Bed composed of rocks, gravel, and sand; rock control, semipermanent. One channel at all stages. Banks high and not subject to overflow under ordinary conditions.

Extremes of discharge.—Maximum stage recorded during year, 6.3 feet during night of September 2 (discharge, not estimated); minimum stage, 2.0 feet September 6 and 9 (discharge, 0.2 second-foot).

1914–15: Maximum stage recorded, 6.3 feet night of September 2, 1915 (discharge, not estimated); minimum stage, 1.70 feet March 24–28 and April 1–2, 1914 (discharge, zero).

Winter flow.—Stream freezes over, but flow is usually very small.

Diversions.—Below all diversions. At certain seasons a small amount of seepage (probably not exceeding 1 or 2 second-feet) enters between gage and mouth of creek.

Regulation.—Flow affected by small storage reservoir and irrigation diversions above.

Accuracy.—Determinations of discharge on days of floods are roughly approximate.

Discharge measurements of Indian Creek at Adamsville, Utah, during the year ending Sept. 30, 1915.

[Made by Lynn Crandall.]

Date.	Gage height.	Discharge.	Date.	Gage height.	Discharge.
	Feet.	*Sec.-ft.*		*Feet.*	*Sec.-ft.*
Nov. 24	1.94	[a] 0.2	May 30	2.72	4.9
Jan. 27 [b]	2.20	.6	July 30	2.11	1.0
May 19	2.79	5.0			

[a] Estimated.

[b] Stage-discharge relation affected by ice.

Daily discharge, in second-feet, of Indian Creek at Adamsville, Utah, for the year ending Sept. 30, 1915.

Day.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.
1	4.5	2.0	0.2	0.4	0.3	0.4	2.6	4.8	3.0	1.2	0.7	0.4
2	4.3	2.0	.4	.8	.5	.4	2.6	7.8	3.0	1.2	.4	.5
3	4.1	1.7	.3	.6	.4	.4	2.8	6.2	3.8	1.1	.6	45
4	4.1	1.4	.3	.5	.4	.4	2.8	6.2	5.7	1.2	1.2	.6
5	3.6	1.6	.3	.4	.4	.4	2.6	8.7	6.9	1.2	1.1	.4
6	4.0	1.6	.3	.4	.4	.4	3.0	7.8	3.4	1.1	1.1	.2
7	5.6	1.7	.3	.8	.4	.4	3.2	5.4	3.2	1.3	.4	.5
8	6.7	1.6	.5	.4	.6	.4	3.4	4.3	2.0	1.2	.5	.2
9	6.3	1.6	.4	.4	1.2	.4	3.3	4.0	1.6	1.2	.5	.2
10	5.6	1.7	.4	.4	1.2	1.4	3.5	3.4	.8	1.2	.5	.3
11	4.5	1.6	.6	.4	1.4	1.2	3.6	3.0	1.2	1.1	.5	.4
12	4.5	1.7	.7	.4	.4	1.1	4.1	2.3	1.4	1.0	.4	.4
13	4.0	1.7	.3	.4	.4	2.9	3.9	2.5	1.4	.9	.4	.4
14	3.6	1.6	.4	.4	.4	3.3	4.5	2.8	1.3	.8	.4	.
15	3.6	2.0	......	.4	.4	1.6	4.3	3.0	1.6	.8	.4	.
16	3.2	2.3	......	.4	.4	4.7	3.8	2.3	1.4	.8	.4	.
17	3.6	2.7	......	......	.4	2.5	3.4	2.6	1.3	.8	.4	.
18	2.9	2.7	......	......	2.5	1.8	3.8	3.8	1.2	.8	.4	1.
19	3.2	2.7	......	......	1.1	1.3	4.1	5.4	1.3	.9	.4	.
20	3.1	.4	......	......	.4	1.7	4.3	9.8	1.4	.8	.4	.
21	3.1	.3	......	......	.4	2.4	3.8	11	1.4	.9	.4	.
22	2.7	.4	......	......	.4	2.6	4.1	12	1.3	.9	.4	.
23	2.9	.3	......	......	.6	2.6	4.1	11	1.3	42	.4	.
24	3.1	.3	......	......	.6	2.7	4.3	11	1.4	1.2	18	.
25	3.2	.3	......	......	.8	2.8	4.1	8.3	1.3	.8	.4	.
26	3.2	.3	......	......	.4	2.8	3.8	4.3	1.3	37	.4	.
27	2.7	.3	......	.6	.4	3.0	2.6	2.3	1.2	4.3	.4	.
28	2.7	.3	......	.6	.4	3.0	1.8	4.5	1.2	1.6	.4	.
29	2.7	.3	......	.4	......	3.4	2.0	4.6	1.3	1.0	.4	.
30	2.6	.2	......	.4	......	2.6	3.0	4.3	1.3	.8	.4	.
31	2.3	......	......	.2	......	2.5	......	3.4	......	.8	.4	......

Note.—Discharge determined from three rating curves poorly defined above 8 second-feet, applicabl as follows: Oct. 1 to Dec. 7, Dec. 8 to Sept. 2, and Sept. 4–30. Mean flow estimated on account of ice a follows: Dec. 15–31, 0.4 second-foot, and Jan. 17–26, 0.5 second-foot. Indirect method for shifting contr used to obtain discharge on Sept. 3.

Monthly discharge of Indian Creek at Adamsville, Utah, for the year ending Sept. 30, 1915.

Month.	Discharge in second-feet.			Run-off (total in acre-feet).	Accuracy.
	Maximum.	Minimum.	Mean.		
October	6.7	2.3	3.75	231	D.
November	2.7	.2	1.31	78	D.
December			.39	24	D.
January			.47	29	D.
February	2.5	.3	.63	35	D.
March	4.7	.4	1.84	113	D.
April	4.5	1.8	3.44	205	D.
May	12	2.3	5.57	342	C.
June	6.9	.8	2.00	119	D.
July	42	.8	3.61	222	D.
August	18	.4	1.07	66	D.
September	45	.2	1.98	118	D.
The year	45	.2	2.17	1,580	

COAL CREEK NEAR CEDAR CITY, UTAH.

Location.—In the E. ½ sec. 13, T. 36 S., R. 11 W., about 500 feet above the power plant and about 1¾ miles southeast of Cedar City, Iron County.

Drainage area.—About 92.5 square miles (measured on topographic maps).

Records available.—May 28 to September 30, 1915.

Gage.—Vertical staff on right bank July 29 to September 30. Read twice during times of considerable diurnal fluctuation, and once daily at other times by Joseph T. Wilkinson. Original gage 150 feet upstream, used May 28 to July 24, rendered useless by shift in channel on July 24.

Discharge measurements.—Made from highway bridge about a mile below or by wading.

Channel and control.—Bed composed of coarse gravel and boulders; shifting

Extremes of stage.—Maximum stage recorded, 4.2 feet July 24 on the old gage (determined from water marks); discharge not determined; minimum stage, 0.60 foot on new gage, September 22–30. Stream is subject to violent floods.

Winter flow.—No information.

Diversion.—The only important diversion above station is power canal, which returns the water to the stream about 500 feet below gage. This diversion is fairly constant, 6 or 7 second-feet, and should be added to obtain the total flow above Cedar City.

Data inadequate for determination of daily discharge.

Discharge measurements of Cedar Electric Co. power plant tailrace near Cedar City, Utah, during the year ending Sept. 30, 1915.

[Made by Lynn Crandall.]

Date.	Gage height.	Discharge.	Date.	Gage height.	Discharge.
	Feet.	*Sec.-ft.*		*Feet.*	*Sec.-ft.*
May 28	2.30	448	July 29	[a] 0.94	19.9
29	1.63	264			

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[a] New gage installed this date 150 feet below old gage.

Discharge measurements of Cedar Electric Co. power plant tailrace near Cedar City, Utah, during the year ending Sept. 30, 1915.

[Made by Lynn Crandall.]

Date.	Gage height.	Discharge.
	Feet.	*Sec.-ft.*
May 28	0.95	6.1
July 29	1.00	7.2

Daily gage height, in feet, of Coal Creek near Cedar City, Utah, for the period May 28 to Sept. 30, 1915.

Day.	May.	June.	July.	Aug.	Sept.	Day.	May.	June.	July.	Aug.	Sept.
1		1.87	0.30	0.88	1.16	16		0.94	-0.11	0.80	0.62
2			.28	.88	.98	17			-.12	.80	.62
3		1.49	.38	.86	.98	18			-.13	.78	.62
4		1.33	.28	.86	.74	19			-.14	.77	.64
5		1.22	.22	.84	.68	20		.78	-.16	.77	.66
6		1.26	.18	1.04	.66	21		.76	-.17	.77	.62
7		1.25	.16	.88	.70	22		.70	1.7	.77	.61
8		1.29	.08	.84	.68	23		.70	3.0	.77	.60
9		1.35	.04	.82	.66	24		.65	4.2	.77	.60
10		1.32	.02	.81	.64	25		.60		.76	.60
11		1.28	.0	.80	.64	26		.54		.94	.60
12		1.26	-.02	.80	.62	27		.50		.82	.60
13		1.09	-.06	.79	.62	28	2.30	.44		.76	.60
14		.96	-.08	.80	.62	29	1.94	.36	.92	.78	.60
15		.93	-.10	.80	.62	30	1.96	.32	.90	.88	.60
						31	1.54		.89	.80	

MINOR BASINS IN NEVADA.

SNAKE CREEK NEAR BAKER, NEV.

Location.—In the N. ½ sec. 13, T. 12 N., R. 69 E., in White Pine County, at the Tilford tungsten mine, 2½ miles below junction of North and South forks, 9 miles west of Garrison, Utah, about 16 miles from Baker, Nev., and 70 miles southeast of Ely, White Pine County.

Drainage area.—Thirty square miles (measured on maps issued by Forest Service).

Records available.—August 13, 1913, to September 30, 1915 (fragmentary). Station discontinued.

Gage.—Vertical staff on right bank opposite mine foreman's residence; read twice daily by J. D. Tilford.

Discharge measurements.—Made by wading.

Channel and control.—Bed composed of coarse gravel and boulders; steep gradient. One channel. Banks high, not subject to overflow. Control permanent except during extreme floods. Gage height of zero flow about 1.4 feet on September 6, 1915.

Extremes of discharge.—Maximum stage recorded during year, 2.32 feet June 17–20 (discharge, 39 second-feet); minimum stage, 1.69 feet September 29 and 30 (discharge, 1.6 second-feet).

1913–1915: Maximum stage recorded, 2.60 feet June 7, 1914 (discharge, 85 second-feet); minimum stage, 1.20 feet December 20, 1913 (discharge, 0.5 second-foot).

Winter flow.—Stage-discharge relation at times seriously affected by ice.

Diversions.—None of any importance above station.

Regulation.—None.

Accuracy.—Records fair.

Discharge measurements of Snake Creek near Baker, Nev., during the year ending Sept. 30, 1915.

[Made by A. B. Purton.]

Date.	Gage height.	Discharge.	Date.	Gage height.	Discharge.
	Feet.	*Sec.-ft.*		*Feet.*	*Sec.-ft.*
May 2	1.77	3.1	July 11	2.03	12.3
July 11	2.03	13.2	Sept. 6	1.71	2.0

Daily discharge, in second-feet, of Snake Creek near Baker, Nev., for the year ending Sept. 30, 1915.

Day.	May.	June.	July.	Aug.	Sept.	Day.	May.	June.	July.	Aug.	Sept.
1		9.0	25	6.9	2.6	16	6.9	36	11	3.8	2.1
2	3.2	9.8	25	6.9	2.5	17	6.9	39	11	3.8	1.9
3		11	25	6.9	2.3	18	9.0	39	11	3.8	1.9
4		11	23	6.9	2.2	19	9.0	39	11	3.8	1.9
5		14	11	6.9	2.1	20	7.7	39	11	3.8	1.9
6		16	21	6.9	1.9	21	6.9	36	10	3.8	1.9
7		17	17	6.9	1.9	22	6.9	34	10	3.8	1.9
8		23	17	6.3	1.9	23	6.9	34	9.0	3.7	1.9
9		36	16	5.4	1.7	24	6.9	34	9.0	3.6	1.9
10		36	16	5.4	1.9	25	9.0	30	9.0	3.5	1.9
11		32	14	4.7	11	26	6.9	30	8.5	3.4	1.7
12		25	14	4.7	8.5	27	6.9	30	8.1	3.2	1.7
13		32	14	4.4	4.7	28	6.9	30	7.7	3.1	1.7
14		35	14	3.8	3.4	29	9.0	29	6.9	3.0	1.7
15		36	13	3.8	2.8	30	8.1	25	6.9	2.9	1.6
						31	9.0		6.9	2.8	

Note.—Discharge determined from a fairly well defined rating curve. Discharge Aug. 23 to Sept. 4 interpolated because of uncertainty of gage readings during period.

Monthly discharge of Snake Creek near Baker, Nev., for the year ending Sept. 30, 1915.

Month.	Discharge in second-feet.			Run-off (total in acre-feet).	Accuracy.
	Maximum.	Minimum.	Mean.		
May 16-31	9.0		7.68	244	B.
June	39	9.0	28.2	1,680	C.
July	25	6.9	13.6	836	B.
August	6.9	2.8	4.60	283	B.
September	11	1.6	2.63	156	C.
The period				3,200	

BAKER CREEK NEAR BAKER, NEV.

Location.—In sec. 14, T. 13 N., R. 69 E., about 200 feet below the mouth of Quinn Young Creek, 1¼ miles below Pole Creek, 1⅓ miles below the Narrows, and about 4 miles west of Baker, White Pine County.

Drainage area.—About 10 square miles (measured on maps issued by Forest Service).

Records available.—August 12, 1913, to November 30, 1915 (fragmentary); station discontinued.

Gage.—Staff gage with one inclined and two vertical sections, on right bank; read twice a week by W. H. Kious.

Discharge measurements.—Made by wading.

Channel and control.—Bed composed of gravel and large stones; fairly permanent. Channel rough and steep. Banks moderately low; right bank subject to overflow at extreme high stages; small overflow channel on right side.

Extremes of discharge.—Maximum stage recorded during year, 2.2 feet June 11 and 18 (discharge, 100 second-feet); minimum stage, 1.32 feet September 6 and 9 (discharge, 4.4 second-feet).

1913–1915; maximum stage recorded, 3.0 feet June 2 and 5, 1914 (discharge, 170 second-feet); minimum mean daily discharge, 2 second-feet January 6 and 9, 1914 (stage, 1.4 feet).

Winter flow.—Stage-discharge relation seriously affected by ice gorges; gage-height observations discontinued during winter.

Diversions.—None above station.

Regulation.—None so far as known.

Accuracy.—Records fair; impracticable to obtain daily gage readings, and the readings themselves are uncertain at times.

Discharge measurements of Baker Creek near Baker, Nev., during the period May 1, 1915, to June 22, 1916.

Date.	Made by—	Gage height.	Discharge.
1915.		*Feet.*	*Sec.-ft.*
May 1	A. B. Purton	1.50	8.6
July 10	do	1.68	27.5
10	do	1.68	26.0
Sept 6	do	1.32	4.4
1916.			
June 22[a]	L. W. Jordan	1.80	39.2

[a] A new canal diverting above the gage was carrying 7.8 second-feet on this date.

Daily discharge, in second-feet, of Baker Creek near Baker, Nev., for the period Oct. 1, 1914, to Nov. 30, 1915.

Day.	Oct.	Nov.	Dec.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.
1						8.6	70					4.0
2	8.6	8.6			8.6							
3						8.0			8.6	5.1		
4			8.6				85				5.8	
5									8.6			4.0
6	8.6	8.6			8.6	8.6						
7												
8			8.6				70				4.4	4.0
9	8.6				8.6					4.4		
10		8.6						26	8.6			4.0
11			8.6			8.6	100					
12											4.4	2.7
13	8.6								5.8			
14						17				6.4		
15		8.6		8.6			85				4.4	
16	8.6				8.6							
17		8.6					100			5.8		2.7
18						29						
19				8.6							4.0	2.7
20	8.6	8.6						17				
21						29				5.8		
22	8.6			8.6	8.6		85					
23	8.6	8.6						17				
24									5.8	5.8		2.7
25						29						
26				8.6							4.0	4.0
27	8.6	8.6			8.6			13	5.4	5.8		
28						29						
29											4.0	
30	8.6	8.6		8.6	8.6			8.6		5.8		4.0
31									5.4			

NOTE.—Discharge determined from a fairly well-defined rating curve. Record discontinued Dec. 16, 1914, to Mar. 14, 1915.

Monthly discharge of Baker Creek near Baker, Nev., for the period Oct. 1, 1914, to Nov. 30, 1915.

Month.	Discharge in second-feet.			Run-off (total in acre-feet).	Accuracy.
	Maximum.	Minimum.	Mean.		
1914–15.					
October	8.6	8.6	8.57	527	
November	8.6	8.6	8.60	512	
December 1–15	8.6	8.0	8.50	253	
March 15–31	8.6	8.6	8.60	290	
April	8.6	8.6	8.60	512	D.
May	29	8.0	21.7	1,330	C.
June	100	70	81.9	4,870	C.
July	26	8.6	24.7	1,520	C.
August	8.6	5.4	6.72	413	D.
September	6.4	4.4	5.50	327	D.
October	5.8	4.0	4.46	274	D.
November	4.0	2.7	3.40	202	D.

NOTE.—Mean determined by interpolating daily discharge for days on which gage was not read. Maxima and minima only represent discharge on days when gage was read.

CLEVELAND CREEK NEAR OSCEOLA, NEV.

LOCATION.—In sec. 19, T. 16 N., R. 67 E., about 1½ miles southwest of the Cleveland ranch buildings, 8 miles below mouth of canyon, 7 miles below junction of North and South forks, about 12 miles northwest of Osceola, White Pine County, and 45 miles by road southeast of Ely.

Drainage area.—About 32 square miles (measured on maps issued by Forest Service).

Records available.—May 29, 1914, to September 30, 1915.

Gages.—No. 1 or lower gage is vertical staff on left bank about 500 feet above diverson dam for main irrigation ditches, installed July 10, 1915, at same site, but datum 0.92 foot higher than inclined staff installed August 10, 1913. No. 2, or upper gage, is vertical staff on right bank about a mile above gage No. 1 and 200 feet above a ditch that is used intermittently.

On account of its accessibility, gage No. 1 is read except when water is being carried in the upper ditch: readings are obtained about three times a week by L. Snyder (for dates that each gage was used see footnote to table of daily discharge).

Discharge measurements.—Made by wading.

Channel and control.—Bed composed of coarse gravel and small boulders with steep gradient; fairly permanent, but likely to shift during high water. Conditions are similar at the two gages, but the control for the upper one is more permanent. Banks moderately low, with a fringe of willows; subject to overflow at extremely high stages.

Extremes of discharge.—Maximum discharge for year, 30 second-feet June 8–10 (stage, lower gage, 1.25 feet); minimum discharge, 5.0 second-feet September 28–30 (stage, lower gage, 0.96 foot).

1914–15: Maximum discharge, 44 second-feet June 3, 1914 (stage, upper gage, 1.40 feet); minimum discharge, 5.0 second-feet September 28–30, 1915 (stage, lower gage, 0.96 foot).

Winter flow.—Stage-discharge relation seriously affected by ice at times; flow determined from observer's notes and climatic data. Water is usually diverted between gages during winter.

Diversions.—Gage No. 2 is above all diversions.

Regulation.—Discharge as given shows the natural flow of stream, as the lower gage is not read when water is being diverted between the gages.

Accuracy.—Records only fair, owing to impossibility of obtaining daily gage readings.

Discharge measurements of Cleveland Creek near Osceola, Nev., during the year ending Sept. 30, 1915.

[Made by A. B. Purton.]

At Gage No. 1 (lower gage.)

Date.	Gage height.	Discharge.	Date.	Gage height.	Discharge.
	Feet.	*Sec.-ft.*		*Feet.*	*Sec.-ft.*
May 1[a]	1.27	15.2	Sept. 5	1.04	6.6
July 10	1.15	11.9			

At Gage No. 2 (upper gage).

Date.	Gage height.	Discharge.	Date.	Gage height.	Discharge.
	Feet.	*Sec.-ft.*		*Feet.*	*Sec.-ft.*
Apr. 30[a]	1.09	19.2	Sept. 5	0.88	7.6
July 9	.99	12.7			

[a] Water being diverted between the two gages.

Daily discharge, in second-feet, of Cleveland Creek near Osceola, Nev., for the year ending Sept. 30, 1915.

Day.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.
1		9.7									8.3	
2	8.5		9.7				11	16	28			
3					8.3	8.3						6.2
4		9.7	8.3				11		28		7.2	
5	9.0				8.3	8.3		17				6.6
6		8.3							28			6.6
7	9.0				8.3	7.6	11	18			8.2	
8		8.3							30		7.5	
9							11	17				6.6
10	9.0			8.3	8.3	8.3			30	12	8.0	6.2
11		9.7					11			9.8	7.5	
12	9.0				7.2	8.3		18				6.6
13		9.7		8.3					26		7.5	
14	8.5				7.2	8.3	12	21		9.8		
15		8.3		7.6							7.8	6.6
16	8.5						14	24	20	9.5		
17				8.3	8.3	8.3		25				6.6
18	8.5	9.7					14		18	9.5	7.2	
19					8.3	8.3		22				6.2
20		9.7		8.3			14		13		6.8	
21	8.5			8.3	8.3	8.3	14	22		9.2		
22		7.6									6.5	5.7
23	8.5						16	22	13	8.8		
24				8.3	8.3	8.3						5.4
25	9.0	9.7					16		12	9.2	6.5	
26					7.2	8.3		19				5.4
27		9.7		8.3			16		12	9.2	6.2	
28	9.0				8.3	8.3		16		8.5		5.0
29		6.6		9.2			18				6.2	
30							18			7.6		5.0
31	8.5			8.3		9.2		22			6.8	

NOTE.—Discharge determined from two poorly defined curves at lower gage, one used Oct. 2–31, May 5–16, and July 10, the other Sept. 3–30, and one well defined at upper gage used Nov. 1 to May 2, May 17 to June 27, July 25–27, and July 30 to Aug. 1. Indirect method for shifting control used July 11–24, 28, and Aug. 4–31. Mean discharge estimated, on account of ice, Dec. 5–31, 7 second-feet; and Jan. 1–9, 7.5 second-feet; mean flow estimated 12 second-feet, June 28 to July 9, on account of uncertainties in the gage-height record. Allowance should be made for probable difference in flow past the two gages even when no water is being diverted between them. (See list of measurements.)

Monthly discharge of Cleveland Creek near Osceola, Nev., for the year ending Sept. 30, 1915.

[Drainage area, 32 square miles.]

Month.	Discharge in second-feet.			Run-off (total in acre-feet).	Accuracy.
	Maximum.	Minimum.	Mean.		
October	9.0	8.5	8.76	539	C.
November	9.7	6.6	8.97	534	B.
December	9.7		7.25	446	D.
January	9.2		8.09	497	D.
February	8.3	7.2	8.05	447	B.
March	9.2	7.6	8.30	510	B.
April	18	11	13.3	791	B.
May	25	16	19.5	1,200	B.
June	30		20.7	1,230	B.
July		7.6	10.1	621	C.
August	8.3	6.2	7.19	442	C.
September	6.6	5.0	6.10	363	C.
The year	30	5.0	10.5	7,620	

NOTE.—Monthly totals obtained by interpolating discharge for days on which gage was not read. Maxima and minima only for days on which gage was read.

CURRANT CREEK NEAR CURRANT, NEV.[1]

Location.—In sec. 25, T. 11 N., R. 58 E., at highway bridge at Cazier's ranch, on road from Ely to Tonopah, 2 miles above Currant, Nye County, and 2½ miles below inflow from Cazier's reservoir.

Drainage area.—Not measured.

Records available.—May 5 to September 30, 1913; May 25, 1914, to September 30, 1915.

Gage.—Vertical staff nailed to downstream side of right abutment; read once daily by Edmund Cazier.

Discharge measurements.—Made by wading or from bridge at gage.

Channel and control.—Bed composed of gravel and boulders; will probably scour. One channel at all stages. Banks high and clean. Control was changed in April, 1914, by riprap walls built to protect bridge.

Extremes of discharge.—Maximum stage recorded during year, 3.5 feet April 30 and May 1 (discharge, 24 second-feet); minimum discharge, 2.6 second-feet September 28 (stage, 2.6 feet).

1913–1915: Maximum occurred in 1915 (see preceding paragraph); minimum discharge, 2.6 second-feet September 3, 1913, and September 28, 1915.

Winter flow.—Stage-discharge relation not seriously affected by ice; open-channel rating curve used; fed by springs in canyon about half a mile above gage.

Diversions.—Three small irrigation canals divert water above gage; total capacity 3 to 5 second-feet.

Regulation.—Flow somewhat affected by inflow from Cazier's reservoir and by changes in irrigation canals above gage.

Accuracy.—Records fair.

Discharge measurements of Currant Creek near Currant, Nev., during the year ending Sept 30, 1915.

[Made by A. B. Purton.]

Date.	Gage height.	Discharge.	Date.	Gage height.	Discharge.
	Feet.	*Sec.-ft.*		*Feet.*	*Sec.-ft.*
July 8	2.94	10.4	Sept. 7	2.55	4.2
8	2.94	10.7			

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[1] Called Currant Creek at Cazier's ranch in previous reports.

Daily discharge, in second-feet, of Currant Creek near Currant, Nev., for the year ending Sept. 30, 1915.

Day.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.
1	3.6	5.6	5.6	5.6	5.6	5.6	5.6	24	14	12	5.6	5.6
2	3.6	5.6	5.6	5.6	5.6	5.6	5.6	22	14	12	5.6	5.6
3	3.6	5.6	5.6	5.6	5.6	5.6	5.6	22	12	12	5.6	5.6
4	3.6	5.6	5.6	5.6	5.6	5.6	5.6	22	12	12	5.6	5.6
5	4.8	5.6	5.6	5.6	5.6	5.6	5.6	21	12	12	5.6	5.2
6	5.6	5.6	5.6	5.6	5.6	5.6	5.6	19	12	12	5.6	4.7
7	5.6	5.6	5.6	5.6	5.6	5.6	5.6	18	12	12	5.6	4.2
8	5.6	5.6	5.6	5.6	5.6	5.6	5.6	18	12	11	5.6	4.2
9	5.6	5.6	5.6	5.6	5.6	5.6	5.6	16	14	10	5.6	4.2
10	5.6	5.6	5.6	5.6	5.6	5.6	5.6	15	13	10	5.6	4.1
11	5.6	5.6	5.6	5.6	5.6	5.6	5.6	15	12	9.0	5.6	4.0
12	5.6	5.6	5.6	5.6	5.6	5.6	5.6	12	12	9.0	5.6	3.9
13	5.6	5.6	5.6	5.6	5.6	5.6	5.6	12	12	10	5.6	3.9
14	5.6	5.6	5.6	5.6	5.6	5.6	7.2	12	12	10	5.6	3.8
15	5.6	5.6	5.6	5.6	5.6	5.6	8.1	12	12	9.0	5.6	3.7
16	5.6	5.6	5.6	5.6	5.6	5.6	9.0	12	12	9.0	6.4	3.6
17	5.6	5.6	5.6	5.6	5.6	5.6	9.0	11	14	10	9.0	3.5
18	5.7	5.6	5.6	5.6	5.6	5.6	12	21	14	9.0	8.1	3.4
19	5.7	5.6	5.6	5.6	5.6	5.6	12	21	12	9.0	7.2	3.4
20	5.8	5.6	5.6	5.6	5.6	5.6	12	21	12	8.1	7.2	3.3
21	5.8	5.6	5.6	5.6	5.6	5.6	12	14	10	8.1	7.2	3.2
22	5.9	5.6	5.6	5.6	5.6	5.6	13	12	10	8.1	6.4	3.1
23	5.9	5.6	5.6	5.6	5.6	5.6	16	12	10	8.1	5.6	3.0
24	6.0	5.6	5.6	5.6	5.6	5.6	16	12	10	8.1	5.6	2.9
25	6.0	5.6	5.6	5.6	5.6	5.6	16	11	10	8.1	5.6	2.8
26	6.1	5.6	5.6	5.6	5.6	5.6	16	11	10	8.1	5.6	2.8
27	5.6	5.6	5.6	5.6	5.6	5.6	15	10	10	8.1	5.6	2.7
28	5.6	5.6	5.6	5.6	5.6	5.6	16	10	10	7.2	5.6	2.6
29	5.6	5.6	5.6	5.6	......	5.6	20	10	10	6.4	5.6	5.0
30	5.6	5.6	5.6	5.6	......	5.6	24	10	12	5.6	5.6	5.0
31	5.6	......	5.6	5.6	......	5.6	......	12	......	5.6	5.6	......

NOTE.—Discharge obtained from two curves; one fairly well defined between 4 and 16 second-feet, applicable Oct. 1 to Sept. 9; the other, poorly defined, applicable Sept. 29 and 30. Discharge Sept. 10-28 interpolated on account of shift in control. Increased discharge Sept. 29 was due to closing head gates of canals diverting above gages. Discharge interpolated for days on which gage was not read.

Monthly discharge of Currant Creek near Currant, Nev., for the year ending Sept. 30, 1915.

Month.	Discharge in second-feet.			Run-off (total in acre-feet).	Accuracy.
	Maximum.	Minimum.	Mean.		
October	6.1	3.6	5.40	332	C.
November	5.6	5.6	5.60	333	C.
December	5.6	5.6	5.60	344	C.
January	5.6	5.6	5.60	344	C.
February	5.6	5.6	5.60	311	C.
March	5.6	5.6	5.60	344	C.
April	24	5.6	10.2	607	C.
May	24	10	15.2	935	C.
June	14	10	11.8	702	C.
July	12	5.6	9.31	572	B.
August	9.0	5.6	6.00	369	B.
September	5.6	2.6	3.95	235	C.
The year	24	2.6	7.49	5,430	

SALTON SEA BASIN.

SALTON SEA NEAR SALTON, CAL.

Location.—Near the mouth of Salt Creek, about a mile west of Durmid, about 2½ miles east of Salton, Riverside County, and 7 miles east of Mecca.

Records available.—November, 1904, to September 30, 1915.

Gage.[1]—Vertical staff in several sections fastened to piling. Gage is graduated to feet and inches and is inverted (reads down), with its zero at 6.1 feet above mean sea level, United States Geological Survey datum. To obtain depths, subtract reading from 279.6 feet, because the lowest point in bottom of Salton Sea is at 273.5 feet below mean sea level, United States Geological Survey datum. Gage is read by an employee of Southern Pacific Co. Original gage, November 1, 1904, to February 26, 1906, was established by New Liverpool Salt Co. at a point about 3½ miles northwest of Salton; it reads depths directly. First Survey gage, March 2, 1906, to June 5, 1906, half a mile west of Salton, also reads depths directly. First Southern Pacific Co.'s gage, June 6, 1906, to July 5, 1909, was at present site, with its zero at 6.8 feet above mean sea level, United States Geological Survey datum; readings from its inverted scale, subtracted from 280.35 feet, gave depths in Salton Sea. Second Survey gage, July 6, 1909, to April 21, 1914, located at the same place, read elevations below mean sea level, United States Geological Survey datum; readings subtracted from 273.5 feet gave depths. The present gage has been read since April 24, 1914.

Extremes of depth.—Maximum depth during year, 42.45 feet October 2; minimum depth, 38.25 feet September 24.

1904–1915: Maximum depth, 76.0 feet February 10 to March 29, 1907; minimum depth, no water at gage November 1 to 14, 1904.

Cooperation.—The Southern Pacific Co. has furnished the record since June 30, 1914.

Area of sea was 443 square miles January 1, 1909.

Practically all the water now received by Salton Sea enters by Alamo and New rivers, chiefly the former. These rivers run through Imperial Valley and are drainage channels for excess and waste waters from the irrigation system and from the power plants. The following table shows the depth of Salton Sea:

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[1] History of gages previously published in water-supply papers incomplete and some statements regarding datums erroneous.

Daily depth, in feet, of Salton Sea near Salton, Cal., for the year ending Sept. 30, 1915.

Day.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.
1				41.75								
2	42.45						41.1			39.95		
3												38.6
4			41.85						40.25			
5					41.5	41.35						
6		41.95									39.2	
7								40.7				
8				41.7								
9	42.25						41.0			39.75		
10												38.6
11			41.85						40.25			
12					41.5	41.3						
13		41.85									39.0	
14								40.6				
15				41.65								
16	42.2						40.95			39.6		
17												38.45
18			41.8						40.2			
19					41.45	41.25						
20		41.85									38.85	
21								40.5				
22				41.6								
23	42.1						40.85			39.45		
24												38.35
25			41.75						40.1			
26					41.4	41.2						
27		41.85									38.75	
28								40.45				
29				41.6								
30	42.0						40.75			39.35		
31												

OWENS LAKE BASIN.

OWENS RIVER NEAR ROUND VALLEY, CAL.

Location.—In the SE. ¼ sec. 10, T. 6 S., R. 31 E., near Sheep bridge, 700 feet above mouth of Rock Creek, and 2 miles north of Round Valley, Inyo County.

Drainage area.—About 450 square miles.

Records available.—August 4, 1903, to September 30, 1915.

Gage.—Vertical staff on left bank 85 feet below bridge; read by William Roberts; datum differs from that of the prevous gage, used prior to May 29, 1907, which was 100 feet above the present one.

Discharge measurements.—Made from cable at gage.

Channel and control.—Stream bed composed of a rock and boulders; fairly permanent. One channel at all stages.

Extremes of discharge.—Maximum stage recorded during year, 2.95 feet at 10.30 a. m. June 30 (discharge, 508 second-feet); minimum stage recorded, 1.83 feet at 10.27 a. m. January 16 (discharge, 156 second-feet).

1913–1915: Maximum stage recorded, 4.0 feet June 30, 1907 (discharge, 1,190 second-feet); minimum discharge, 120 second-feet September 21, 1913.

Winter flow.—Shore ice exists at times, but ordinarily does not affect stage-discharge relation.

Diversions.—No water is diverted above station.

Regulation.—None.

Accuracy.—Records considered good.

Cooperation.—Gage heights and discharge measurements furnished by the city of Los Angeles.

Discharge measurements of Owens River near Round Valley, Cal., during the year ending Sept. 30, 1915.

[Made by J. E. Jones.]

Date.	Gage height.	Discharge.	Date.	Gage height.	Discharge.	Date.	Gage height.	Discharge.
	Feet.	*Sec.-ft.*		*Feet.*	*Sec.-ft.*		*Feet.*	*Sec.-ft.*
Nov. 11	2.00	196	May 26	2.15	211	June 18	2.70	415
Dec. 15	1.96	174	May 27	2.20	241	Aug. 18	2.10	226
16	2.06	200	June 17	2.70	396	Aug. 19	2.12	222
Apr. 7	2.30	264						

Daily discharge, in second-feet, of Owens River near Round Valley, Cal., for the year ending Sept. 30, 1915.

Day.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.
1	[a] 332	256	[a] 192	170	[a] 184	216	285	300	425	465	335	216
2	405	[a] 249	192	[a] 165	177	[a] 196	[a] 278	[a] 300	[a] 380	[a] 455	[a] 344	204
3	[a] 370	242	[a] 192	160	170	177	270	300	335	445	352	192
4	335	[a] 242	192	[a] 165	192	170	[a] 278	300	[a] 318	465	[a] 344	[a] 204
5	[a] 326	242	[a] 192	170	[a] 181	[a] 174	285	335	300	[a] 445	335	216
6	318	[a] 236	192	[a] 174	170	177	[a] 278	[a] 310	[a] 309	425	[a] 344	[a] 198
7	[a] 302	229	[a] 186	177	[a] 170	[a] 174	270	285	318	[a] 438	352	170
8	285	[a] 229	181	[a] 174	170	170	[a] 278	[a] 285	[a] 302	[a] 452	[a] 326	[a] 176
9	285	229	[a] 181	170	192	[a] 170	285	285	285	465	300	181
10	[a] 278	[a] 210	181	160	[a] 184	170	[a] 278	[a] 270	[a] 285	[a] 455	[a] 292	[a] 186
11	270	192	[a] 179	[a] 162	177	[a] 170	270	256	285	445	285	192
12	[a] 278	[a] 204	177	164	[a] 174	170	[a] 270	[a] 263	[a] 257	[a] 455	[a] 264	192
13	285	216	[a] 184	[a] 166	170	170	270	270	229	465	242	[a] 186
14	[a] 278	[a] 204	192	168	[a] 170	[a] 170	[a] 263	[a] 263	[a] 206	[a] 455	242	181
15	270	192	181	[a] 162	170	170	256	256	181	445	[a] 249	[a] 186
16	270	[a] 192	192	156	[a] 178	[a] 174	[a] 263	285	[a] 293	[a] 445	256	192
17	270	192	170	168	185	177	270	242	405	445	[a] 236	[a] 186
18	[a] 278	[a] 192	[a] 165	[a] 169	[a] 181	181	[a] 263	[a] 249	405	[a] 435	216	181
19	285	192	160	170	177	[a] 176	256	256	425	425	216	[a] 186
20	[a] 270	[a] 192	170	[a] 170	[a] 174	170	[a] 263	242	[a] 398	425	229	192
21	256	192	[a] 174	170	170	[a] 174	270	[a] 249	370	445	[a] 222	181
22	270	[a] 192	177	[a] 169	170	177	[a] 256	256	[a] 408	[a] 445	216	[a] 176
23	[a] 256	192	[a] 174	168	[a] 170	[a] 172	242	[a] 249	445	445	[a] 222	170
24	242	[a] 184	170	170	170	168	[a] 249	242	[a] 445	[a] 455	229	[a] 170
25	[a] 249	177	[a] 169	[a] 174	[a] 170	[a] 172	256	[a] 236	445	465	[a] 222	170
26	256	[a] 184	168	177	170	177	[a] 256	229	[a] 465	[a] 418	216	[a] 170
27	[a] 249	192	[a] 169	[a] 174	[a] 170	[a] 172	256	242	485	370	[a] 236	176
28	242	[a] 190	170	170	170	168	[a] 263	242	[a] 485	[a] 352	256	[a] 170
29	242	188	160	170	....	[a] 169	270	242	485	335	[a] 249	170
30	[a] 256	192	[a] 165	[a] 181	....	170	[a] 285	[a] 324	508	[a] 335	242	170
31	270	....	170	192	....	177	....	405	....	335	[a] 229	....

[a] Interpolated.

NOTE.—Discharge determined from a fairly well-defined rating curve; discharge interpolated when gage heights were not available.

Monthly discharge of Owens River, near Round Valley, Cal., for the year ending Sept. 30, 1915.

Month.	Discharge in second-feet.			Run-off (total in acre-feet).	Accuracy.
	Maximum.	Minimum.	Mean.		
October	405	242	263	17,400	B.
November	256	177	207	12,300	B.
December	192	160	178	10,900	B.
January	192	156	170	10,500	B.
February	192	170	175	9,720	B.
March	216	168	175	10,800	B.
April	285	242	268	15,900	B.
May	405	229	273	16,800	B.
June	506	181	363	21,600	B.
July	465	335	431	26,500	B.
August	352	216	268	16,500	B.
September	216	170	184	10,900	B.
The year	506	156	248	180,000	

OWENS RIVER NEAR BIG PINE, CAL.

Location.—In sec. 2, T. 11 S., R. 34 E., at Charlies Butte, about 11 miles southeast of Big Pine, Inyo County.

Drainage area.—Not measured.

Records available.—September 20, 1906, to September 30, 1915.

Gage.—Vertical staff on left bank; read once daily by J. I. Jones.

Discharge measurements.—Made from cable at gage or by wading.

Channel and control.—Stream bed composed of sand and gravel; slightly shifting. Right bank high; left bank subject to overflow during floods.

Extremes of discharge.—Maximum stage recorded during year, 4.2 feet at 11 a. m. July 7 (discharge, 805 second-feet); minimum stage, 0.70 foot at 3 p. m. May 29 (discharge, 86 second-feet).

1906–1915: Maximum stage recorded, 11.2 feet January 26, 1914 (approximate discharge determined from extension of rating curve, 3,220 second-feet); minimum stage, —0.05 foot June 13, 14, 15, and 16, 1908 (discharge, 36 second-feet).

Winter flow.—Stage-discharge relation not affected by ice.

Diversions.—On account of diversions above station, the record does not indicate the total run-off from the drainage area.

Regulation.—Flow is partially regulated by diversions.

Accuracy.—Records considered excellent.

Cooperation.—Gage heights and discharge measurements furnished by the city of Los Angeles.

Discharge measurements of Owens River near Big Pine, Cal., during the year ending Sept. 30, 1915.

[Made by J. E. Jones.]

Date.	Gage height.	Discharge.	Date.	Gage height.	Discharge.	Date.	Gage height.	Discharge.
	Feet.	*Sec.-ft.*		*Feet.*	*Sec.-ft.*		*Feet.*	*Sec.-ft.*
Oct. 1	2.49	409	Apr. 9	2.00	293	June 19	2.80	453
Nov. 10	2.70	433	26	.90	108	Aug. 6	1.39	176
13	2.72	451	May 24	.88	103	16	.85	101
Dec. 14	2.75	422	28	.75	90	20	.80	100
Mar. 20	2.51	387	June 3	2.46	407	26	.75	98
Apr. 5	2.90	494	15	2.80	490	Sept. 24	1.00	127

Daily discharge, in second-feet, of Owens River near Big Pine, Cal., for the year ending Sept. 30, 1915.

Day.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.
1	396	440	440	533	605	533	418	418	194	605	275	99
2	396	463	440	533	605	581	418	396	247	630	256	99
3	396	463	440	557	605	557	418	440	375	705	238	99
4	418	440	463	557	605	509	486	463	375	730	229	99
5	418	440	509	557	605	486	486	463	354	755	220	99
6	418	440	509	557	605	463	463	605	333	780	185	99
7	418	440	486	533	581	463	375	509	333	805	169	99
8	418	440	463	533	557	463	396	486	396	680	162	99
9	418	440	463	509	557	463	294	418	418	630	146	99
10	418	440	463	509	557	463	275	396	463	605	139	99
11	418	440	463	509	630	463	256	375	557	557	139	112
12	396	440	486	509	655	463	247	333	557	630	132	112
13	396	440	486	509	605	463	238	333	509	705	118	112
14	396	463	463	509	605	440	194	266	463	705	118	112
15	418	463	440	509	557	463	185	238	463	655	118	112
16	396	463	463	463	557	440	169	229	440	605	106	112
17	418	463	463	463	581	418	154	238	440	557	99	112
18	418	440	463	463	581	418	139	256	463	486	106	118
19	418	440	486	486	557	418	118	185	463	486	99	125
20	418	440	486	486	533	396	132	154	463	463	99	125
21	418	440	486	509	509	396	125	146	463	440	92	125
22	440	463	463	509	486	396	125	139	463	418	92	125
23	463	463	463	509	509	396	118	125	486	509	92	125
24	440	463	463	509	486	396	112	112	509	557	92	125
25	440	463	463	509	463	375	112	99	557	557	92	139
26	440	463	486	509	486	375	112	92	509	605	92	211
27	418	463	509	509	463	396	112	99	509	605	92	275
28	418	463	533	509	486	418	118	92	509	581	92	294
29	463	463	533	557	....	463	139	86	557	440	92	284
30	463	440	509	605	....	486	294	112	581	418	92	294
31	440	....	509	605	....	463	....	146	....	375	92	....

NOTE.—Discharge determined from a well-defined rating curve.

Monthly discharge of Owens River near Big Pine, Cal., for the year ending Sept. 30, 1915.

Month.	Discharge in second-feet.			Run-off (total in acre-feet).	Accuracy.
	Maximum.	Minimum.	Mean.		
October	463	396	421	25,900	A.
November	463	440	451	26,800	A.
December	533	440	477	29,300	A.
January	605	463	520	32,000	A.
February	655	463	558	31,000	A.
March	581	375	449	27,600	A.
April	486	112	241	14,300	A.
May	605	86	273	16,800	A.
June	581	194	448	26,700	A.
July	805	375	590	36,300	A.
August	275	92	134	8,240	A.
September	294	99	138	8,210	A.
The year	805	86	391	283,000	

OWENS RIVER NEAR LONE PINE, CAL.

Location.—In the NW. ¼ sec. 23, T. 15 S., R. 36 E., at Mount Whitney highway bridge, about 2½ miles northeast of Lone Pine, Inyo County.

Drainage area.—Not measured.

Records available.—January 1, 1909, to September 30, 1915.

Gage.—Vertical staff fastened to a pile at downstream side of bridge; read once daily by G. F. Marsh. The high water, January 27–29, 1914, raised the pier to which gage was fastened 1.83 feet; gage has not been reset.

Discharge measurements.—Made from cable about 1,000 feet below bridge or by wading.

Channel and control.—Bed composed of sand; fairly permanent. One channel at low stages; three or more during floods.

Extremes of discharge.—Maximum stage recorded during year, 6.1 feet at 9.30 a. m. February 3 (discharge, 729 second-feet); minimum stage, 1.80 feet August 17 and 18 (discharge, 38 second-feet).

1909–1915: Maximum stage recorded, 10.6 feet July 7, 1909 (discharge, 2,050 second-feet); minimum stage, 2.6 feet June 27 to July 4 and July 12 to 19, 1913 (discharge, 6 second-feet).

Winter flow.—Shore ice sometimes forms at the station during very cold weather, but probably does not affect the stage-discharge relation; no ice during 1914–15.

Diversions.—Record does not show total run-off from drainage area on account of diversions above station. The Los Angeles Aqueduct, which has its intake above the station, was formally opened February 13, 1913.

Regulation.—Flow is partially regulated by the diversions above.

Accuracy.—Records considered good.

Cooperation.—Gage heights and discharge measurements furnished by the city of Los Angeles.

Discharge measurements of Owens River near Lone Pine, Cal., during the year ending Sept. 30, 1915.

[Made by J. E. Jones.]

Date	Gage height.	Discharge.	Date.	Gage height.	Discharge.	Date.	Gage height.	Discharge.
	Feet.	*Sec.-ft.*		*Feet.*	*Sec.-ft.*		*Feet.*	*Sec.-ft.*
Oct. 26	4.10	328	Apr. 27	2.82	134	July 28	3.80	284
Nov. 2	4.10	328	May 17	3.30	200	Aug. 9	2.68	125
Dec. 7	4.35	357	21	3.00	153	27	2.13	67
12	4.10	333	June 7	3.70	264	Sept. 25	2.30	75
Mar. 22	4.25	366	12	4.30	372			

Daily discharge, in second-feet, of Owens River near Lone Pine, Cal., for the year ending Sept. 30, 1915.

Day.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.
1	104	349	384	499	707	384	384	181	144	384	203	61
2	128	421	384	519	707	384	384	233	174	402	188	61
3	140	499	384	519	729	384	249	249	197	459	174	61
4	160	519	384	519	663	384	218	281	220	479	188	61
5	233	519	384	539	641	332	203	349	242	499	210	61
6	249	539	384	539	641	315	196	315	265	539	188	61
7	281	539	384	539	619	315	188	384	265	539	167	61
8	281	539	384	519	619	315	188	402	249	384	147	61
9	281	539	384	519	619	315	188	421	249	599	128	61
10	281	519	384	519	619	315	174	440	281	599	89	61
11	265	499	384	539	599	298	147	384	298	499	79	61
12	281	421	384	539	599	233	147	315	315	499	74	61
13	281	421	384	539	579	281	140	281	384	499	61	61
14	298	402	384	539	499	315	122	249	384	499	53	66
15	315	402	384	539	440	315	128	233	384	519	53	70
16	315	402	402	539	421	349	110	218	366	519	45	70
17	315	402	402	539	402	349	110	203	366	539	38	79
18	315	402	402	539	384	349	99	203	349	519	38	79
19	315	402	402	539	384	366	99	189	332	499	70	79
20	315	402	402	559	384	384	89	174	384	499	79	79
21	315	402	421	559	384	384	79	160	366	402	79	79
22	315	402	440	559	384	366	79	157	349	233	70	79
23	315	421	559	559	366	349	99	155	349	233	61	84
24	315	421	499	559	366	349	140	153	349	218	61	84
25	315	402	459	559	366	281	140	150	421	233	53	84
26	332	402	479	539	384	281	134	147	421	233	70	84
27	332	402	519	499	384	298	134	128	421	249	64	79
28	349	402	539	499	384	315	134	100	421	281	61	79
29	349	384	519	539	....	315	140	89	402	265	61	147
30	349	384	519	619	....	332	160	84	402	249	61	174
31	349	....	519	707	....	384	....	114	....	226	61	....

NOTE.—Discharge determined from a well-defined rating curve. Discharge May 19, 20, 22–25, 27, 28, 31, June 1, and 3–5, interpolated when gage heights were not available.

Monthly discharge of Owens River near Lone Pine, Cal., for the year ending Sept. 30, 1915.

Month.	Discharge in second-feet.			Run-off (total in acre-feet).	Accuracy.
	Maximum.	Minimum.	Mean.		
October	349	104	283	17,400	A.
November	539	349	439	26,100	A.
December	559	384	427	26,300	A.
January	707	499	543	33,400	A.
February	729	366	510	28,300	A.
March	384	233	333	20,500	A.
April	384	79	160	9,520	A.
May	440	84	231	14,200	B.
June	421	144	325	19,300	B.
July	599	218	413	25,400	A.
August	210	38	96.6	5,880	A.
September	174	61	76.3	4,540	A.
The year	729	38	319	231,000	

OWENS LAKE NEAR LONE PINE,[1] CAL.

LOCATION.—On the west shore of Owens Lake, 1 mile north of Brier Siding on California & Nevada Railroad (Southern Pacific Co.), and about 9 miles south of Lone Pine, Inyo County.

RECORDS AVAILABLE.—March, 1908, to September 30, 1915.

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[1] Formerly known as "near Olancha."

Gage.—Vertical staff, installed November 1, 1911, at a boulder point east of railroad culvert No. 507B; read once a day by an employee of the city of Los Angeles. Original gage, vertical staff near the old Smith ranch, was submerged in July, 1911, and an upper section was installed. Gage datum before July 29, 1913, 3,564.90 feet above sea level, United States Geological Survey datum; after that date, 3,561.90 feet. January 12, 1915, gage was washed out but was replaced at same location and datum.

Extremes of stage.—1911–1915: Maximum stage recorded, 8.75 feet March 16 and April 7, 1912; minimum stage, 4.3 feet November 22 and December 4, 1913.

Cooperation.—Records furnished by City of Los Angeles.

Elevation, in feet, of Owens Lake near Lone Pine, Cal., for the year ending Sept. 30, 1915.

Day.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.
1												6.50
2		6.25	6.50			7.74			7.55	7.35	7.10	
3				6.60								
4								7.75				
5							7.85					
6	6.35											
7												
8		6.30	6.52						7.52			6.30
9										7.30		
10						7.79					6.90	
11												
12			6.50					7.75				
13												6.10
14	6.30											
15							7.75				6.81	
16												
17		6.35			7.59	7.84			7.45			
18												6.20
19										7.25		
20	6.32											
21								7.65				
22			6.50				7.75					
23					7.64							
24		6.45				7.87				7.20		6.30
25												6.00
26												
27	6.30		6.60									
28												
29		6.48				7.79	7.70		7.38			
30								7.60				
31												

Note.—To reduce elevations to mean sea level (U. S. Geological Survey datum), add 3,570 feet.

ROCK CREEK NEAR ROUND VALLEY, CAL.

Location.—In the NE. ¼ SE. ¼ sec. 9, T. 6. S., R. 31 E., below highway bridge a short distance above mouth of Pine Creek, and 2 miles northwest of Round Valley, Inyo County.

Drainage area.—Approximately 46 square miles.

Records available.—August 3, 1903, to September 30, 1915.

Gage.—Vertical staff on left bank about 600 feet below bridge; read by William Roberts; prior to July, 1906, gage at highway bridge.

Discharge measurements.—Made from footbridge at gage or by wading.

Channel and control.—Bed composed of sand and cobblestones; somewhat shifting.

Extremes of discharge.—Maximum stage recorded during year, 2.8 feet at 10 a. m. June 28 (discharge, 111 second-feet); minimum discharge, 19 second-feet March 28, 31, and April 23.

1903–1915: Maximum stage recorded, 5.0 feet January 25, 1914 (discharge, 360 second-feet); minimum stage, 1.0 foot April 20–23, 1905 (discharge, 14 second-feet).

Winter flow.—Shore ice forms, but probably does not affect stage-discharge relation.

Diversions.—Water for irrigation is diverted above station.

Regulation.—Flow partially regulated by diversions.

Accuracy.—Records fair.

Cooperation.—Gage-height records and current-meter measurments furnished by the city of Los Angeles.

Discharge measurements of Rock Creek near Round Valley, Cal., during the year ending Sept. 30, 1915.

[Made by J. E. Jones.]

Date.	Gage height.	Discharge.	Date.	Gage height.	Discharge.	Date.	Gage height.	Discharge.
	Feet.	*Sec.-ft.*		*Feet.*	*Sec.-ft.*		*Feet.*	*Sec.-ft.*
Nov. 11	1.50	33	May 27	1.40	28	Aug. 19	1.28	28
Dec. 15	1.45	29	June 17	2.12	96			
Apr. 8	1.30	24	Aug. 18	1.20	24			

Daily discharge, in second-feet, of Rock Creek near Round Valley, Cal., for the year ending Sept. 30, 1915.

Day.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.
1	[a]52	41	[a]31	29	[a]34	46	21	28	93	94	40	24
2	50	[a]38	29	[a]29	33	[a]46	[a]21	[a]32	[a]90	[a]86	[a]40	[a]24
3	[a]46	35	[a]30	30	36	45	22	37	86	78	40	23
4	43	[a]34	32	[a]28	46	43	[a]24	46	[a]82	[a]77	[a]39	[a]24
5	[a]42	33	[a]32	27	[a]40	[a]40	25	61	78	76	38	24
6	40	[a]32	33	[a]30	35	37	[a]25	[a]45	[a]72	[a]73	[a]36	[a]23
7	[a]38	30	[a]32	32	[a]35	[a]36	25	29	66	70	35	22
8	37	[a]29	30	[a]30	36	34	25	[a]26	[a]68	[a]72	[a]32	[a]23
9	37	29	[a]28	29	46	[a]32	27	24	70	74	29	24
10	[a]40	[a]31	27	30	[a]40	31	[a]26	[a]23	[a]66	[a]70	[a]28	[a]24
11	42	33	[a]28	[a]28	33	[a]30	25	22	63	66	26	24
12	[a]47	[a]33	29	27	[a]34	28	[a]25	[a]23	[a]68	[a]68	[a]25	26
13	52	33	[a]30	[a]28	35	31	25	24	72	70	24	[a]28
14	[a]54	[a]33	30	29	[a]38	[a]28	[a]25	[a]26	[a]77	[a]68	24	29
15	57	33	27	[a]28	42	25	25	27	82	66	[a]25	[a]30
16	65	[a]32	[a]27	27	[a]44	[a]25	[a]23	29	[a]88	[a]65	26	32
17	55	30	27	30	46	25	21	27	94	64	[a]25	[a]32
18	[a]54	[a]32	[a]27	[a]30	[a]42	28	[a]21	[a]28	[a]96	[a]61	24	32
19	52	33	26	30	39	[a]26	21	29	98	58	28	35
20	[a]46	[a]32	27	[a]32	[a]37	25	[a]21	27	[a]100	55	26	[a]35
21	41	30	[a]27	33	35	[a]27	22	[a]27	102	58	[a]26	35
22	39	[a]29	27	[a]33	33	29	[a]20	27	[a]106	[a]56	26	[a]35
23	[a]36	29	[a]27	33	[a]33	[a]26	19	[a]27	111	55	[a]26	35
24	33	[a]28	26	33	33	22	[a]20	27	[a]104	[a]58	26	[a]35
25	[a]42	27	[a]25	[a]33	[a]33	[a]24	22	[a]24	98	62	[a]25	35
26	50	[a]28	24	33	33	25	[a]22	22	[a]98	[a]54	24	[a]35
27	[a]52	30	[a]26	[a]32	[a]34	[a]22	22	27	98	47	[a]24	35
28	53	[a]28	27	30	35	19	[a]24	27	[a]96	[a]45	24	[a]34
29	46	27	24	36	....	[a]20	25	29	94	43	[a]26	34
30	[a]47	33	[a]26	[a]36	....	22	[a]26	[a]36	98	[a]42	29	35
31	48	....	27	36	....	19	....	42	....	41	[a]26	....

[a] Interpolated.

Note.—Discharge determined from six rating curves as follows: Oct. 1–16, well defined; Oct. 17 to Mar. 1, fairly well defined below 60 second-feet; Mar. 2 to May 5, poorly defined; May 6 to June 1, fairly well defined below 60 second-feet; June 2–23, poorly defined; June 24 to Sept. 30, fairly well defined below 60 second-feet; discharge interpolated for days when gage heights were not available.

Monthly discharge of Rock Creek near Round Valley, Cal., for the year ending Sept. 30, 1915.

Month.	Discharge in second-feet.			Run-off (total in acre-feet).	Accuracy.
	Maximum.	Minimum.	Mean.		
October	65	33	46.3	2,850	C.
November	41	27	31.5	1,870	B.
December	33	24	28.0	1,720	B.
January	36	27	30.7	1,890	B.
February	46	33	37.1	2,060	C.
March	46	19	29.5	1,810	C.
April	27	19	23.2	1,380	C.
May	61	22	29.9	1,840	B.
June	111	63	87.1	5,180	C.
July	94	41	63.6	3,910	C.
August	40	24	28.8	1,770	B.
September	35	22	29.5	1,760	B.
The year	111	19	38.7	28,000	

PINE CREEK NEAR ROUND VALLEY, CAL.

LOCATION.—In the NE. ¼ SE. ¼ sec. 9, T. 6 S., R. 31 E., 300 feet above highway bridge, about 600 feet above junction with Rock Creek, and 2 miles northwest of Round Valley, Inyo County.

DRAINAGE AREA.—About 32 square miles above mouth of canyon.

RECORDS AVAILABLE.—August 3, 1903, to September 30, 1915.

GAGE.—Vertical staff on left bank; read by William Roberts. Prior to May 13, 1908, gage was 150 feet below highway bridge.

DISCHARGE MEASUREMENTS.—Made from footbridge at gage or by wading.

CHANNEL AND CONTROL.—Bed composed of lava rock and sand; fairly permanent.

EXTREMES OF DISCHARGE.—Maximum stage recorded during year, 5.3 feet in mornings of June 27, 30, and July 1 (discharge, 140 second-feet); minimum stage, 3.25 feet at 4.25 p. m. April 27 and 7.40 a. m. April 29 (discharge, 0.6 second-foot).

1903–1915: Maximum discharge, 370 second-feet June 22, 1911; minimum stage recorded, 3.2 feet June 15, 1913 (discharge, 0.2 second-foot).

WINTER FLOW.—Ice occasionally forms at station, but probably does not affect stage-discharge relation.

DIVERSIONS.—Water is diverted above station for irrigation.

REGULATION.—Diversions probably affect the flow.

ACCURACY.—Records fair.

COOPERATION.—Gage heights and discharge measurements furnished by the city of Los Angeles.

Discharge measurements of Pine Creek near Round Valley, Cal., during the year ending Sept. 30, 1915.

[Made by J. E. Jones.]

Date.	Gage height.	Discharge.	Date.	Gage height.	Discharge.
	Feet.	*Sec.-ft.*		*Feet.*	*Sec.-ft.*
Nov. 11	3.62	6.2	June 17	4.88	100
Dec. 15	3.55	4.5	18	5.16	122
Apr. 8	3.50	3.9	Aug. 18	3.50	3.4
May 27	3.63	5.8			

Daily discharge, in second-feet, of Pine Creek near Round Valley, Cal., for the year ending Sept. 30, 1915.

Day.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.
1	[a]12	4.5	[a]3.2	3.2	[a]4.9	13	3.9	1.4	124	140	6.8	2.4
2	9.0	[a]4.2	3.2	[a]3.6	4.0	[a]8.0	[a]3.9	[a]3.3	[a]102	[a]132	[a]6.0	[a]2.0
3	[a]8.2	4.0	[a]3.2	4.0	7.4	3.0	3.9	5.2	80	124	5.3	1.5
4	7.4	[a]4.9	3.2	[a]3.6	13	2.0	[a]3.9	10	[a]76	[a]126	[a]4.9	[a]1.8
5	[a]8.2	5.8	[a]3.2	3.2	[a]9.4	[a]2.0	3.9	19	71	120	4.5	2.0
6	9.0	[a]4.5	3.2	[a]3.0	5.8	2.0	[a]3.9	[a]14	[a]66	[a]118	[a]3.8	[a]1.8
7	[a]7.4	3.2	[a]2.6	2.9	[a]5.8	[a]2.0	3.9	8.1	62	108	3.2	1.5
8	5.8	[a]2.4	2.0	[a]3.0	5.8	2.0	3.9	[a]5.4	[a]58	[a]116	[a]2.4	[a]1.5
9	10	1.5	[a]1.8	3.2	13	[a]2.0	3.9	2.6	53	124	1.5	1.5
10	[a]8.4	[a]4.0	1.5	3.2	[a]9.4	2.0	[a]3.4	[a]2.2	[a]60	[a]116	[a]1.5	[a]1.5
11	6.8	6.4	[a]1.8	[a]3.0	5.8	[a]2.5	3.0	1.8	66	108	1.5	1.5
12	[a]7.1	[a]4.8	2.0	2.9	[a]5.2	3.0	[a]3.4	[a]1.8	[a]80	[a]113	[a]1.8	2.0
13	7.4	3.2	[a]1.8	[a]3.0	4.5	2.0	3.9	1.8	94	118	2.0	[a]1.8
14	[a]6.6	[a]3.8	1.5	3.2	[a]3.8	[a]2.0	[a]3.4	[a]1.4	[a]101	[a]104	[a]1.8	1.5
15	5.8	4.5	4.5	[a]2.4	3.2	2.0	3.0	1.0	108	89	1.5	[a]1.8
16	7.4	[a]3.8	[a]3.0	1.5	[a]4.5	[a]2.3	[a]3.2	1.5	[a]103	[a]80	1.5	2.0
17	3.2	3.2	1.5	1.5	5.8	2.6	3.5	1.0	98	71	[a]2.4	[a]1.8
18	[a]3.8	[a]3.6	[a]2.0	[a]1.8	[a]5.2	3.9	[a]3.2	[a]1.2	118	[a]71	3.2	1.5
19	4.5	4.0	2.4	2.0	4.5	[a]3.0	3.0	1.5	118	71	[a]3.8	2.0
20	[a]3.8	[a]3.6	1.5	[a]1.8	[a]4.2	2.0	[a]2.5	1.0	[a]113	62	4.5	[a]1.8
21	3.2	3.2	[a]1.5	1.5	4.0	[a]2.3	2.0	[a]1.0	108	71	[a]3.8	1.5
22	3.2	[a]3.2	1.5	[a]1.8	3.2	2.6	[a]1.4	1.0	[a]118	[a]94	3.2	[a]1.5
23	[a]3.2	3.2	[a]1.8	2.0	[a]2.6	[a]2.3	.8	[a]1.0	129	118	[a]3.6	1.5
24	3.2	[a]3.2	2.0	3.2	2.0	2.0	[a]1.1	1.0	[a]129	[a]104	4.0	[a]1.4
25	[a]3.2	3.2	[a]1.8	[a]3.2	[a]1.8	[a]2.3	1.4	[a]1.8	129	89	[a]3.6	1.3
26	3.2	[a]3.6	1.5	3.2	1.5	2.6	[a]1.0	2.6	[a]134	[a]49	3.2	[a]1.4
27	[a]3.2	4.0	[a]1.5	[a]3.2	[a]2.0	[a]2.3	.6	5.9	140	9.0	[a]3.6	1.5
28	3.2	[a]3.4	1.5	3.2	2.4	2.0	[a] .6	2.6	[a]137	[a]9.5	4.0	[a]1.5
29	3.2	2.9	1.1	4.5	......	[a]2.0	.6	8.8	134	10	[a]4.6	1.5
30	[a]3.2	3.2	[a]1.3	[a]5.2	......	2.0	[a]1.0	[b]7.0	140	[a]9.5	5.3	1.5
31	3.2	......	1.5	5.8	......	2.0	......	102	......	9.0	[a]3.8	......

[a] Interpolated.

[b] Estimated.

Monthly discharge of Pine Creek near Round Valley, Cal., for the year ending Sept. 30, 1915.

Month.	Discharge in second-feet.			Run-off (total in acre-feet).	Accuracy.
	Maximum.	Minimum.	Mean.		
October	12	3.2	5.71	351	B.
November	6.4	1.5	3.77	224	B.
December	4.5	1.1	2.13	131	B.
January	5.8	1.5	2.99	184	B.
February	13	1.5	5.17	287	D.
March	13	2.0	2.83	174	C.
April	3.9	.6	2.70	161	C.
May	102	1.0	6.93	426	C.
June	140	53	102	6,070	B.
July	140	9.0	86.8	5,340	B.
August	6.8	1.5	3.44	212	B.
September	2.4	1.3	1.66	99	B.
The year	140	.6	18.8	13,700	

MONO LAKE BASIN.

MONO LAKE NEAR MONO LAKE, CAL.

Location.—In lot 6, SE. ¼ NE. ¼ sec. 31, T. 2 N., R. 26 E., about 2 miles south of Mono Lake post office, Mono County.

Records available.—June 15, 1912, to September 30, 1915; fragmentary.

Gage.—Vertical staff fastened to willow tree about 400 feet from Hammon's store; read by F. B. Clark.

Extremes of stage.—1912–1915: Maximum stage recorded, 13.30 feet May 27, 1915; minimum stage recorded, 7.93 feet December 11, 1913.

Cooperation.—Gage-height record furnished by United States Forest Service.

Gage height, in feet, of Mono Lake near Mono Lake, Cal., for the year ending Sept. 30, 1915.

Date.	Gage height.	Date.	Gage height.	Date.	Gage height.
Oct. 4	10.33	Mar. 12	10.60	May 4	12.70
31	10.18	31	10.70	8	12.76
Dec. 30	10.05	Apr. 10	10.72	14	13.10
Jan. 26	10.10	24	10.75	27	13.30
Feb. 25	10.56				

LEEVINING CREEK NEAR MONO LAKE, CAL.

Location.—In the SE. ¼ SE. ¼ sec. 17, T. 1 N., R. 26 E., at ranger station in Mono National Forest, about 3½ miles above the mouth, and 4 miles south of Mono Lake post office, Mono County.

Drainage area.—Not measured.

Records available.—November 17, 1910, to June 25, 1915; fragmentary.

Gage.—Vertical staff fastened to cottonwood tree on left bank, 250 feet below ranger station; read by F. B. Clark.

Discharge measurements.—Made by wading near gage.

Channel and control.—Bed composed of gravel; practically permanent.

Extremes of discharge.—Maximum stage recorded during year, 4.0 feet at 8 a. m., June 12 (discharge, 356 second-feet); minimum stage, 2.10 feet at 12.30 p. m. January 30 (discharge, 18 second-feet).

1910–1915: Maximum stage recorded, 4.9 feet June 19, 1911 (discharge, 750 second-feet); minimum stage, 2.04 feet March 2, 1912 (discharge, 12 second-feet).

Winter flow.—Stage-discharge relation affected by ice.

Diversions.—Water diverted above this station for irrigating less than 100 acres.

Regulation.—No information.

Accuracy.—Records good for periods in which gage is read. Rating curve, which has been used since 1910, is assumed to apply this year, as current-meter measurements have not been made since June, 1914.

Cooperation.—Gage-height record furnished by United States Forest Service.

Daily discharge, in second-feet, of Leevining Creek near Mono Lake, Cal., for the year ending Sept. 30, 1915.

Day.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	June.
1	[a]39	23	19					
2	39	22						
3	38	22						
4	37	21	19					
5	36	21					29	
6	36	20						
7	[a]35	20	19					
8	34	[a]20				22		
9	31	20						326
10	29	[a]20						
11	28	20						
12	26	[a]20						356
13	26	20						
14	25	[a]20						341
15	24	[a]20						
16	[a]23	20						
17	23	20						
18	23	[a]19			29			
19	23	[a]19						
20	23	19					29	
21	26	19						326
22	25	[a]19				22		
23	23	19						
24	23	[a]19						
25	23	19						312
26	23	[a]19						
27	[a]23	19						
28	23	[a]19					31	
29	23	[a]19						
30	23	19		18				
31	23							

[a] Interpolated.

NOTE.—Discharge determined from a well-defined rating curve (see remarks under Accuracy in the station description). Stage-discharge relation affected by ice Dec. 14–30. From December to June no discharge record published when gage was not read. Mean flow, for October, 27.6 second-feet (total run-off, 1,700 acre-feet); for November, 19.9 second-feet (total run-off, 1,180 acre-feet).

WALKER LAKE BASIN.

EAST WALKER RIVER NEAR MASON, NEV.

LOCATION.—In sec. 26, T. 12 N., R. 25 E., at highway bridge 2½ miles above junction with West Walker River, and 7 miles above Mason, Lyon County.

DRAINAGE AREA.—1,230 square miles.

RECORDS AVAILABLE.—November 21, 1910, to September 15, 1912; July 5, 1913, to September 30, 1915. From 1902 to 1908 a station was maintained at Ross ranch, a short distance above present station.

GAGE.—Inclined staff on left bank 50 feet below highway bridge, August 1, 1914, to September 30, 1915; read by Mrs. J. H. Hillbun. Original gage, vertical staff on left bank, November 21, 1910, to September 15, 1912, and July 5, 1913, to September 30, 1913; inclined staff on right bank set at 0.31 foot lower datum, October 1, 1913, to June 22, 1914; temporary staff on left bank 25 feet below highway bridge, July 1 to July 31, 1914.

DISCHARGE MEASUREMENTS.—Made from highway bridge 50 feet above gage or by wading.

CHANNEL AND CONTROL.—Bed composed of loose sand. Banks cave in at high stages. One channel at all stages.

Extremes of discharge.—Maximum stage recorded during year, 3.3 feet at 10 a. m. July 5 (discharge, 374 second-feet); minimum stage, 0.1 foot August 12–18 (discharge, 1.5 second-feet).

1910–1915: Maximum stage recorded, 8.3 feet January 26, 1914 (discharge, 1,470 second-feet); minimum stage, 1.6 feet August 6, 1913 (discharge, zero).

Winter flow.—Stage-discharge relation affected by ice for short periods; flow estimated from observer's notes.

Diversions.—Water to irrigate about 10,000 acres is diverted above station.

Regulation.—Only the irrigation diversions.

Accuracy.—Records poor; rating curves not well defined.

Discharge measurements of East Walker River near Mason, Nev., during the year ending Sept. 30, 1915.

Date.	Made by—	Gage height.	Discharge.	Date.	Made by—	Gage height.	Discharge.
		Feet.	*Sec.-ft.*			*Feet.*	*Sec.-ft.*
Oct. 14	L. W. Jordan	1.90	94	May 5	L. W. Jordan	1.98	130
Dec. 8	....do	2.20	89	June 19	....do	2.30	184
Feb. 11	....do	2.71	94	Aug. 24	A. B. Purton	.32	5.3

Daily discharge, in second-feet, of East Walker River near Mason, Nev., for the year ending Sept. 30, 1915.

Day.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.
1	94	120	112	112	130	93	260	96	35	251	29	19
2	94	120	123	109	130	82	270	96	41	290	24	24
3	106	120	120	107	130	82	260	108	48	310	15	29
4	106	106	117	104	117	82	251	108	56	331	11	35
5	106	106	114	113	117	82	242	134	65	374	8	35
6	106	106	113	111	117	82	232	134	85	352	5	35
7	106	106	88	108	117	82	232	134	108	310	3	35
8	121	106	88	105	104	72	214	134	121	290	3	35
9	121	106	88	102	104	72	214	134	134	270	3	35
10	121	106	88	99	104	72	214	134	163	251	3	35
11	106	106	88	108	95	72	196	121	179	232	3	35
12	106	106	88	105	93	72	196	121	232	232	1.5	35
13	106	106	78	91	93	72	196	121	270	214	1.5	35
14	94	106	78	88	93	72	179	108	270	214	1.5	48
15	94	106	78	64	93	72	179	108	251	196	1.5	41
16	106	106	68	54	93	72	179	96	232	179	1.5	41
17	106	106	68	54	93	85	163	96	232	148	1.5	35
18	106	106	68	54	93	90	148	85	214	134	1.5	29
19	120	104	68	54	93	96	148	85	188	121	5	29
20	120	101	60	54	93	102	148	85	179	108	11	24
21	120	99	60	46	93	121	134	75	179	96	11	24
22	135	102	60	46	93	141	134	65	179	85	11	24
23	135	106	60	46	93	163	121	56	163	96	11	24
24	135	104	51	46	93	188	121	48	163	108	8	29
25	120	114	51	46	93	232	121	41	163	121	8	48
26	120	112	51	72	93	260	108	35	163	108	8	48
27	120	109	58	93	93	270	108	35	163	75	11	41
28	120	120	65	104	93	260	108	35	163	56	11	41
29	135	117	72	117	....	251	108	35	179	48	15	41
30	135	114	80	117	....	260	108	29	214	41	15	41
31	135	....	89	117	....	251	....	29	....	35	19	....

Note.—Discharge determined from four poorly defined rating curves applicable Oct. 1 to Nov. 18; Dec. 9-25; Jan. 16 to Mar. 16; and Apr. 6 to Sept. 30; and by indirect method for shifting control for all other days.

Monthly discharge of East Walker River near Mason, Nev., for the year ending Sept. 30, 1915.

Month.	Discharge in second-feet.			Run-off (total in acre-feet).	Accuracy.
	Maximum.	Minimum.	Mean.		
October	135	94	115	7,070	B.
November	120	99	108	6,430	C.
December	123	51	80.3	4,940	B.
January	117	46	85.4	5,250	C.
February	130	93	102	5,660	B.
March	270	72	129	7,930	C.
April	270	108	176	10,500	C.
May	134	29	87.8	5,400	B.
June	270	35	161	9,580	B.
July	374	35	183	11,300	B.
August	29	1.5	8.44	519	D.
September	48	19	34.3	2,040	D.
The year	374	1.5	106	76,600	

WALKER RIVER AT MASON, NEV.

Location.—In sec. 33, T. 13 N., R. 25 E., at highway bridge at Mason, in Lyon County, and about 4½ miles below junction of East and West Walker rivers.

Drainage area.—2,370 square miles.

Records available.—November 21, 1910, to September 15, 1912; July 3, 1913, to September 30, 1915.

Gage.—Vertical staff fastened to downstream pile of second bent from right end of bridge; read twice daily by H. C. Hansen.

Discharge measurements.—Made from bridge at gage.

Channel and control.—Bed composed of loose sand; control is rock and brush diversion dam about 400 feet downstream from gage; small canal heads just above right end of dam; occasional changes in dam affect stage-discharge relation. One channel at all stages.

Extremes of discharge.—Maximum stage recorded during year, 7.1 feet at 8 a. m. and 5 p. m. June 10 (discharge, 1,530 second-feet); minimum stage, 4.2 feet August 26–31 (discharge, 27 second-feet).

1910–1915: Maximum stage recorded, 8.85 feet June 21–22, 1914 (discharge, 3,410 second-feet); minimum stage, 2.8 feet May 3–7, 1912 (discharge, 25 second-feet).

Winter flow.—Stage-discharge relation slightly affected by ice.

Diversions.—A large part of the flow of the East and West Walker rivers is diverted for irrigation.

Regulation.—Flow affected by irrigation diversions.

Accuracy.—Records poor owing to unstable condition of dam, parts of which were washed away and replaced at different times during year.

Discharge measurements of Walker River at Mason, Nev., during the year ending Sept. 30, 1915.

Date.	Made by—	Gage height.	Discharge.	Date.	Made by—	Gage height.	Discharge.
		Feet.	*Sec.-ft.*			*Feet.*	*Sec.-ft.*
Oct. 13	L. W. Jordan	4.68	194	June 20	L. W. Jordan	6.20	943
Dec. 8	.....do	4.65	209	Aug. 25	A. B. Purton	4.21	28.3
May 4	.....do	5.60	418				

Daily discharge, in second-feet, of Walker River at Mason, Nev., for the year ending Sept. 30, 1915.

Day.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.
1	117	261	264	......	163	222	343	462	991	1,600	148	32
2	117	262	250	......	174	236	311	462	1,180	1,000	129	36
3	117	262	250	......	174	222	311	462	1,130	1,000	104	41
4	126	263	236	......	174	222	343	419	1,080	1,070	82	44
5	135	264	236	......	174	197	361	462	781	1,140	82	46
6	135	264	222	......	174	197	343	508	741	1,200	82	47
7	144	265	210	......	174	187	311	484	932	988	82	47
8	154	266	197	......	174	197	279	419	1,150	816	82	48
9	154	266	185	......	174	187	250	462	1,300	730	82	44
10	165	267	174	174	197	174	295	399	1,530	787	76	45
11	176	268	174	174	210	174	279	399	1,480	846	67	45
12	187	268	174	174	210	174	311	419	1,340	816	55	46
13	187	269	174	174	197	174	326	484	1,140	816	44	47
14	200	270	174	174	197	174	326	484	938	758	41	48
15	200	270	174	174	197	174	343	440	816	675	41	48
16	200	271	....	174	197	174	343	462	938	546	40	39
17	200	272	....	174	210	174	343	532	1,000	476	36	40
18	200	272	....	......	222	187	326	556	816	411	36	36
19	212	273	....	......	222	187	311	508	816	372	36	36
20	212	274	....	......	222	197	343	440	876	336	32	37
21	212	274	....	......	222	210	380	361	816	336	32	38
22	225	275	....	......	197	222	440	295	816	372	32	39
23	239	276	....	......	197	236	462	250	938	498	32	39
24	256	264	....	174	197	264	462	250	988	498	32	40
25	256	264	....	174	210	279	440	250	938	498	27	40
26	257	264	....	174	210	311	419	222	816	453	27	58
27	258	264	....	174	222	343	361	210	730	372	27	53
28	258	264	....	163	222	380	343	285	730	304	27	56
29	259	264	....	163	......	399	361	532	816	244	27	61
30	260	264	....	163	......	343	380	752	988	192	27	68
31	260	....	....	163	......	343	....	828	....	169	27	......

NOTE.—Discharge determined from several rating curves, only fairly well defined, applicable as follows: Oct. 1-23, Nov. 24 to Apr. 10, Apr. 11 to May 27, June 11 to July 21, July 24 to Aug. 15, and Aug. 17 to Sept. 6. Indirect method for shifting control used Oct. 24 to Nov. 23, May 28 to June 10, July 22 and 23, Aug. 16, and Sept. 6-30. Discharge estimated, on account of ice, Dec. 16 to Jan. 9 and Jan. 18-23, 170 second-feet.

Monthly discharge of Walker River at Mason, Nev., for the year ending Sept. 30, 1915.

Month.	Discharge in second-feet.			Run-off (total in acre-feet).	Accuracy.
	Maximum.	Minimum.	Mean.		
October	260	117	196	12,100	B.
November	276	261	267	15,900	B.
December	264	....	188	11,600	C.
January	....	....	171	10,500	C.
February	222	163	197	10,900	C.
March	399	174	231	14,200	B.
April	462	250	348	20,700	B.
May	828	210	435	26,700	B.
June	1,530	730	978	58,200	B.
July	1,200	169	634	39,000	C.
August	148	27	54.6	3,360	C.
September	68	32	44.8	2,670	C.
The year	1,530	27	312	226,000	

WALKER RIVER AT SCHURZ, NEV.

LOCATION.—In sec. 36, T. 13 N., R. 28 E., at highway bridge at Schurz, in Mineral County, 3 miles above Walker Lake and 6 miles below diversion dam of the Walker River Indian Reservation.

DRAINAGE AREA.—2,850 square miles.

Records available.—July 2, 1913, to September 30, 1915.

Gage.—Vertical staff on downstream pile of left abutment of highway bridge, about 300 feet back of depot, August 4, 1914, to September 30, 1915; read twice daily by Joe Mencacci. Original gage, vertical staff fastened to tree on right bank about one-fourth mile above bridge, July 2, 1913, to July 1, 1914, when it was washed out by flood. Present gage at different datum.

Discharge measurements.—Made by wading or from highway bridge.

Channel and control.—Bed composed of loose sand; shifts occasionally. Banks cave at high stages. One channel at all stages.

Extremes of discharge.—Maximum stage recorded during year, 6.85 feet at 2 p. m. June 12 (discharge, 1,180 second-feet); minimum stage, 1.95 feet September 26–30 (discharge, 4 second-feet).

1913–1915: Maximum stage recorded, 11.0 feet June 8 and 9, 1914 (discharge, 2,530 second-feet); minimum stage, 1.60 feet August 17–30, September 23 to October 18, 1913 (discharge, zero).

Winter flow.—Stage-discharge relation affected by ice; flow estimated from discharge measurements, observer's notes, and United States Weather Bureau reports from Fallon, Nev.

Diversions.—Below all diversions.

Regulation.—Flow affected by irrigation diversions above.

Accuracy.—Records fair.

Discharge measurements of Walker River at Schurz, Nev., during the year ending Sept. 30, 1915.

Date.	Made by—	Gage height.	Discharge.	Date.	Made by—	Gage height.	Discharge.
		Feet.	*Sec.-ft.*			*Feet.*	*Sec.-ft.*
Oct. 12	L. W. Jordan	2.96	133	May 6	Frank Weber	4.58	357
Dec. 31[a]	Frank Weber	5.00	209	June 12	.....do	6.67	1,110
Jan. 19[a]	.....do	4.46	138	Aug. 10	.....do	2.06	5.0
Feb. 1	.....do	3.84	228				

[a] Complete ice cover at control; no anchor ice. Stage-discharge relation affected.

Daily discharge, in second-feet, of Walker River at Schurz, Nev., for the year ending Sept. 30, 1915.

Day.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.
1	52	202	250	211	230	280	274	247	440	734	59	5
2	58	219	250	211	222	294	247	294	450	789	48	5
3	60	230	260	208	220	280	247	358	472	820	24	5
4	62	236	254	199	222	280	274	370	486	860	17	5
5	70	247	250	187	213	274	280	370	544	892	24	5
6	72	254	250	187	213	265	314	394	586	912	17	5
7	72	270	247	190	222	284	308	419	648	949	14	5
8	80	270	233	196	222	284	288	445	712	1,060	11	5
9	88	270	230	204	227	284	280	382	800	1,090	8	5
10	106	270	219	216	247	284	265	370	892	844	7	5
11	112	270	216	216	247	256	251	347	1,140	840	7	5
12	127	260	199	202	247	233	227	336	1,170	723	6	5
13	138	260	182	196	247	230	197	321	1,110	674	6	5
14	149	260	152	224	247	222	197	336	1,070	674	6	5
15	152	260	152	213	251	222	197	347	773	615	5	5
16	152	254	138	206	230	222	197	294	629	560	5	5
17	152	250	134	184	238	223	197	256	659	557	5	5
18	152	250	138	158	247	222	197	251	712	399	5	5
19	152	260	142	135	247	222	184	247	723	349	5	5
20	155	260	134	130	247	222	181	265	723	265	5	5
21	166	250	135	142	261	233	181	314	685	227	5	5
22	169	250	138	160	256	247	261	325	674	229	5	5
23	182	250	137	187	261	247	304	288	666	224	5	5
24	196	260	124	213	256	213	304	265	666	201	5	5
25	196	250	124	213	269	216	288	251	674	224	5	5
26	213	260	127	213	280	200	261	213	712	250	5	4
27	216	250	138	213	294	184	247	178	666	250	5	4
28	216	260	152	238	284	216	222	149	670	182	5	4
29	224	250	172	256	......	238	205	139	685	127	5	4
30	233	250	192	256	......	280	213	139	696	114	5	4
31	233	......	206	244	......	294	......	370	......	91	5	......

NOTE.—Discharge determined as follows: Oct. 1, 1914, to Jan. 16, 1915, from a rating curve fairly well defined between 100 and 600 second-feet; Jan. 17-23 and July 10-21, by indirect method for shifting control; Jan. 24 to July 9, from a rating curve well defined between 200 and 1,200 second-feet; July 22 to Sept. 30, from a rating curve well defined up to 500 second-feet. Discharge estimated because of ice from observer's notes, discharge measurements, and climatic records, Dec. 12 to Jan. 23, as in table.

Monthly discharge of Walker River at Schurz, Nev., for the year ending Sept. 30, 1915.

Month.	Discharge in second-feet.			Run-off (total in acre-feet).	Accuracy.
	Maximum.	Minimum.	Mean.		
October	233	52	142	8,730	B.
November	270	202	253	15,100	B.
December	260	124	183	11,300	C.
January	256	130	200	12,300	C.
February	294	213	245	13,600	B.
March	294	184	247	15,200	B.
April	314	181	243	14,500	B.
May	445	139	299	18,400	B.
June	1,170	440	718	42,700	B.
July	1,090	91	540	33,200	B.
August	59	5	10.9	670	B.
September	5	4	4.83	287	C.
The year	1,170	4	257	186,000	

SWAGER CREEK NEAR BRIDGEPORT, CAL.

LOCATION.—In the NW. ¼ NW. ¼ sec. 23, T. 5 N., R. 24 E., at highway bridge three-fourths mile northwest of Mono ranger station, and 4¼ miles northwest of Bridgeport, Mono County.

DRAINAGE AREA.—Not measured.

RECORDS AVAILABLE.—June 1, 1911, to September 30, 1915 (fragmentary), when the station was discontinued.

GAGE.—Vertical staff on right bank, 20 feet above bridge, installed August 24, 1914, at datum 1.00 foot higher than that of original vertical staff at same site, which was destroyed in the spring of 1914 when bridge was rebuilt; read by B. F. Tyler.

Discharge measurements.—Made from highway bridge or by wading.

Channel and control.—Bed composed of gravel and boulders; fairly permanent.

Extremes of discharge.—Maximum stage recorded during year, 2.0 feet at 5 p. m. May 12 (discharge, 67 second-feet); minimum stage, 0.8 foot at 8.50 a. m. August 30 (discharge, 8.0 second-feet).

1911–1915; maximum stage recorded, 4.1 feet June 16, 1911 (discharge, 151 second-feet); minimum discharge, zero April 20, 1912.

Winter flow.—Ice forms for short periods, but does not usually affect the stage-discharge relation.

Diversions.—No information.

Regulation.—No information.

Accuracy.—Records good when gage was read.

Cooperation.—Gage height record furnished by United States Forest Service.

Discharge measurements of Swager Creek near Bridgeport, Cal., during the year ending Sept. 30, 1915.

[Made by H. J. Tompkins.]

Date.	Gage height.	Discharge.	Date.	Gage height.	Discharge.
	Feet.	*Sec.-ft.*		*Feet.*	*Sec.-ft.*
Nov. 28	[a]1.10	15	Aug. 4	0.90	9.9
Mar. 18	1.25	20			

[a] Gage height on old gage, 2.10 feet. Ice on control but stage-discharge relation not affected thereby.

Daily discharge, in second-feet, of Swager Creek near Bridgeport, Cal., for the year ending Sept. 30, 1915.

Date.	Discharge in second-feet.	Date.	Discharge in second-feet.
Nov. 28	15	June 26	22
Mar. 18	20	Aug. 4	9.9
May 12	67	7	9.9
17	63	18	9.9
18	51	19	9.9
20	48	24	9.9
June 16	32	30	8.0
17	32	Sept. 3	9.9

Note.—Discharge determined for days when gage heights were available, from a rating curve well defined below 30 second-feet. Monthly means not determined.

WEST WALKER RIVER NEAR COLEVILLE, CAL.

Location.—In the NE. ¼ NW. ¼ sec. 28, T. 8 N., R. 23 E., at mouth of Ross Canyon, head of Antelope Valley, and 400 feet east of State highway, 1.2 miles above Terry ranch house, 5.5 miles above Coleville, Mono County, and about 40 miles southeast of Gardnerville, Nev.

Drainage area.—245 square miles (measured on topographic maps).

Records available.—June 18 to September 30, 1915. October 5, 1902, to July 31, 1908, a station was maintained half a mile above present gage.

Gage.—Water stage recorder built by S. P. Furguson, Reno, Nev., installed April 29, 1915, on left bank, 15 feet below large yellow-pine tree to which upper section of outside staff gage is fastened, and about 100 feet above Terry canal heading.

Discharge measurements.—Made from cable 15 feet above gage or by wading.

Channel and control.—Bed composed of large boulders; control fairly permanent; gradient is steep. One channel at all stages.

Extremes of discharge.—Maximum stage recorded during year, 4.9 feet at 2 a. m. June 30 (discharge, 1,330 second-feet); minimum stage, 2.38 feet at 3 p. m. October 24 (discharge, 59 second-feet).

Winter flow.—Stage-discharge relation slightly affected by ice.

Diversions.—Station is above all diversions in Antelope Valley.

Regulation.—None.

Accuracy.—Records only fair, owing to varying amount of backwater from temporary jetty at Terry canal heading 100 feet below gage.

Discharge measurements of West Walker River near Coleville, Cal., during the year ending Sept. 30, 1915.

Date.	Made by—	Gage height.	Discharge.	Date.	Made by—	Gage height.	Discharge.
		Feet.	*Sec.-ft.*			*Feet.*	*Sec.-ft.*
Apr. 29	L. W. Jordan	3.50	411	June 30	J. W. Jordan	4.60	1,150
May 2	do	3.26	340	Aug. 5	H. J. Tompkins	3.10	271
June 18	do	4.45	973	23	A. B. Purton	2.74	131

Daily discharge, in second-feet, of West Walker River near Coleville, Cal., for the year ending Sept. 30, 1915.

Day.	June.	July.	Aug.	Sept.	Day.	June.	July.	Aug.	Sept.
1		1,170	258	116	16		678	199	54
2		1,140	239	129	17		649	166	54
3		1,140	202	114	18	1,100	535	148	54
4		1,140	154	101	19	1,140	535	134	47
5		1,030	185	100	20	1,030	591	118	47
6		768	220	99	21	1,030	649	182	42
7		738	202	76	22	1,140	738	129	42
8		830	185	76	23	1,170	678	129	42
9		962	185	66	24	1,140	830	170	47
10		962	170	66	25	1,030	591	154	71
11		1,060	154	64	26	894	482	137	54
12		1,030	154	64	27	962	408	137	54
13		962	140	62	28	1,100	362	121	54
14		830	154	62	29	1,170	319	121	47
15		708	154	62	30	1,170	298	118	47
					31		258	118	

Note.—Discharge determined from two rating curves, one, fairly well defined between 100 and 1,200 second-feet, applicable June 18 to Aug. 15; the other, fairly well defined between 40 and 300 second-feet, applicable during period when jetty was in place, Sept. 13–30. Aug. 16 to Sept. 12 flow determined by indirect method for shifting control.

Monthly discharge of West Walker River near Coleville, Cal., for the year ending Sept. 30, 1915.

Month.	Discharge in second-feet.			Run-off (total in acre-feet).	Accuracy.
	Maximum.	Minimum.	Mean.		
June 18–30	1,170	894	1,060	27,900	B.
July	1,170	258	744	45,700	B.
August	258	118	161	9,900	B.
September	129	42	67.1	3,990	C.
The period				87,500	

WEST WALKER RIVER AT HUDSON, NEV.

Location.—About sec. 11, T. 11 N., R. 24 E., at highway bridge at Hudson, in Lyon County, about a mile above canyon between Smith and Mason valleys.

Drainage area.—About 953 square miles (measured on topographic maps).

Records available.—August 3, 1914, to September 30, 1915.

Gage.—Vertical staff fastened to downstream pile in middle bent of highway bridge; read twice daily by F. B. Mann.

Discharge measurements.—Made from bridge or by wading.

Channel and control.—Bed composed of loose sand; control light gravel riffle. One channel at all stages. Gage height of zero flow about 1.5 feet on August 24, 1915.

Extremes of discharge.—Maximum stage recorded during year, 6.20 feet at 6 p. m. June 9 and 6 a. m. June 10 (discharge, 1,470 second-feet); minimum stage, 2.30 feet August 25 to September 3 (discharge, 31 second-feet).

1914–15: Maximum and minimum stages occurred in 1915.

Winter flow.—Stage-discharge relation slightly affected by ice.

Diversions.—Below all diversions in Smith Valley and above those in Mason Valley.

Regulation.—None.

Accuracy.—Records good.

Discharge measurements of West Walker River at Hudson, Nev., during the year ending Sept. 30, 1915.

Date.	Made by—	Gage height.	Discharge.	Date.	Made by—	Gage height.	Discharge.
		Feet.	*Sec.-ft.*			*Feet.*	*Sec.-ft.*
Oct. 14	L. W. Jordan	3.13	122	June 19	L. W. Jordan	4.93	769
Dec. 9[a]	do	3.06	99	Aug. 24	A. B. Purton	2.31	31.1
May 3	do	3.85	298				

[a] Small amount of shore and anchor ice. Stage-discharge relation affected slightly.

Daily discharge, in second-feet, of West Walker River at Hudson, Nev., for the year ending Sept. 30, 1915.

Day.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.
1	73	153	113		132	164	153	348	1,100	912	97	31
2	75	142	113		132	153	164	348	1,180	860	94	31
3	78	142	113		153	153	188	327	1,130	860	87	31
4	82	142	97		142	132	227	290	860	835	84	34
5	87	142	97		113	132	200	327	786	786	75	34
6	90	142	97	97	113	132	188	348	860	738	71	34
7	97	132	97	97	113	132	164	290	1,060	600	61	34
8	97	132		97	113	132	153	327	1,300	533	56	34
9	105	132		97	113	132	142	308	1,440	577	54	38
10	113	132		97	113	132	132	290	1,440	622	52	38
11	113	132		97	132	113	132	308	1,320	555	46	38
12	113	132		97	132	113	132	388	1,070	491	44	38
13	113	132		97	132	113	142	430	835	430	42	38
14	113	132		113	153	113	188	368	786	388	42	38
15	117	132		113	175	132	242	348	762	368	38	38
16	122	132		113	153	132	200	327	886	368	38	38
17	122	132		113	132	132	153	430	886	368	38	38
18	132	132		113	132	132	164	491	810	308	34	38
19	132	113		113	132	132	242	470	810	242	34	38
20	132	113		113	142	132	368	368	810	214	34	38
21	132	113		113	153	132	512	327	860	214	34	38
22	132	113		113	153	132	491	214	860	388	34	38
23	142	113		113	175	153	388	175	912	430	34	38
24	142	113		113	200	153	368	200	886	409	32	38
25	142	113		113	200	153	348	188	835	368	31	38
26	142	113		113	227	175	327	188	786	308	31	38
27	142	113		113	214	175	308	257	786	242	31	38
28	153	113		113	175	175	290	470	810	214	31	38
29	153	113		113		175	308	810	786	153	31	38
30	153	113		113		175	327	966	886	113	31	38
31	153			113		164		1,070		105	31	

Note.—Discharge determined from a rating curve well defined between 30 and 1,500 second-feet. Discharge, estimated because of ice from observer's notes and one discharge measurement, Dec. 8 to Jan. 5, 99 second-feet.

Monthly discharge of West Walker River at Hudson, Nev., for the year ending Sept. 30, 1915.

Month.	Discharge in second-feet.			Run-off (total in acre-feet).	Accuracy.
	Maximum.	Minimum.	Mean.		
October	153	73	119	7,320	B.
November	153	113	127	7,560	B.
December	113	97	100	6,150	B.
January	113	97	107	6,580	B.
February	227	113	148	8,220	B.
March	175	113	142	8,730	B.
April	512	132	245	14,600	A.
May	1,070	175	387	23,800	A.
June	1,440	762	951	56,600	A.
July	912	105	452	27,800	A.
August	97	31	47.5	2,920	B.
September	38	31	36.6	2,180	B.
The year	1,440	31	238	172,000	

HUMBOLDT-CARSON SINK.

CARSON RIVER BASIN.

EAST FORK OF CARSON RIVER NEAR MARKLEEVILLE, CAL.

Location.—In the NE. ¼ sec. 27, T. 10 N., R. 20 E., at Hangman's bridge, 2 miles east of Markleeville, Alpine County. Indian Creek enters 100 feet above gage and Markleeville Creek 1¼ miles below.

Drainage area.—Not measured.

Records available.—November 13, 1910, to September 30, 1915 (incomplete).

Gage.—Vertical staff, 75 feet below bridge, bolted to rock ledge on right bank; read by W. J. Clark.

Discharge measurements.—Made from cable, installed April 18, 1914, 400 feet below gage, or by wading.

Channel and control.—Bed composed of gravel and small boulders apparently permanent.

Extremes of discharge.—Maximum stage recorded during year, 6.2 feet at 11.20 a. m. June 1 (discharge, 1,400 second-feet); minimum stage, 2.30 feet at 4.30 p. m. November 30 (discharge, 33 second-feet).

1910–1915: Maximum stage recorded, 7.7 feet June 7, 1911 (discharge not determined); minimum stage, 1.45 feet September 20, 1913 (discharge, 6 second-feet). In June, 1885, and March, 1907, water reached a stage equal to about 10.5 feet on the present gage.

Winter flow.—Stage-discharge relation affected by ice.

Diversions.—No information.

Regulation.—Low-water flow augmented by storage developed on Silver Creek above station.

Accuracy.—Records good for days on which gage was read. On account of fragmentary gage-height record, estimates of monthly discharge have not been determined.

Cooperation.—Gage-height record furnished by United States Forest Service.

Discharge measurements of East Fork of Carson River near Markleeville, Cal., during the year ending Sept. 30, 1915.

[Made by H. J. Tompkins.]

Date.	Gage height.	Discharge.	Date.	Gage height.	Discharge.
	Feet.	*Sec.-ft.*		*Feet.*	*Sec.-ft.*
Dec. 2	[a] 2.66	62	Aug. 6	3.06	126
Mar. 24	3.56	253			

[a] Ice on control. Stage-discharge relation not affected thereby.

Daily discharge, in second-feet, of East Fork of Carson River near Markleeville, Cal., for the year ending Sept. 30, 1915.

Day.	Oct.	Nov.	Dec.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.
1							1,400		146	85
2	85		67			298				
3										
4										92
5	85									
6	85	78				272		488	122	
7							1,200			72
8					215					
9										72
10							1,200		99	85
11	85						1,070			85
12	85	70					900			
13	85	66								
14	85						846			
15									99	
16	85	60			385		956			
17						956	900			
18		49								
19	85									
20	99									
21							846			
22						526				
23		66				526	900			49
24		60		215		526				66
25		66					698			
26					385	652				72
27		54								
28						1,010				
29	85						745			66
30	114	33								
31	92									

NOTE.—Discharge determined from a fairly well defined rating curve.

CARSON RIVER NEAR EMPIRE, NEV.

Location.—In sec. 12, T. 15 N., R. 20 E., just below tailrace of Brunswick mill, ½ mile below the highway bridge, and 2 miles below Empire, Ormsby County.

Drainage area.—988 square miles (measured on topographic map).

Records available.—June 25 to December 31, 1895; October 21, 1900, to September 30, 1915.

Gage.—Inclined staff on left bank, used since February 24, 1911; entire flow of river passes this gage; vertical staff on left abutment of highway bridge, June 7, 1907, to February 23, 1911; prior to June 7, 1907, several gages at different points.

Discharge measurements.—Made from cable ½ mile above gage or by wading just above bridge; when made from cable, the power canal is measured and the result added.

Channel and control.—Bed composed of gravel and boulders, fairly permanent. One channel at all stages.

Extremes of discharge.—Maximum stage recorded during year, 6.8 feet June 12 (discharge, 3,100 second-feet); minimum stage, 2.3 feet August 28–31 (discharge, 4 second-feet).

1895, 1900–1915: Maximum stage recorded, 8.0 feet January 23, 1914 (discharge, 5,160 second-feet); minimum stage, 0.7 foot August 31 and September 4, 5, and 14, 1905 (discharge, zero).

Winter flow.—Stage-discharge relation not affected by ice.

Diversions.—A large amount of water is diverted above station for irrigation in Carson Valley. The water diverted by the Brunswick mill power canal is returned to river above gage.

Accuracy.—Records are published as received from the United States Reclamation Service. Records show amount of water available for use in Dayton Valley.

Discharge measurements of Carson River near Empire, Nev., during the year ending Sept. 30, 1915.

Date.	Made by—	Gage height.	Discharge.	Date.	Made by—	Gage height.	Discharge.
		Feet.	*Sec.-ft.*			*Feet.*	*Sec.-ft.*
Apr. 27	L. W. Jordan	4.68	[a] 707	July 19	R. E. Hartley [b]	3.80	187
June 1	R. E. Hartley [b]	6.11	1,890				

[a] Includes 14.3 second-feet flowing in Brunswick power canal.
[b] Employee United States Reclamation Service.

Daily discharge, in second-feet, of Carson River near Empire, Nev., for the year ending Sept. 30, 1915.

Day.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.
1	50	194	155	285	335	335	391	860	2,150	710	50	5
2	50	155	155	285	391	335	391	860	2,520	710	50	5
3	50	155	194	285	450	335	391	710	2,150	780	50	5
4	50	155	194	285	450	285	575	640	1,910	780	36	5
5	50	155	236	285	391	236	575	710	1,880	780	36	5
6	50	155	236	285	335	236	710	860	1,880	710	36	5
7	69	155	236	236	335	236	640	860	1,880	710	36	5
8	69	155	236	236	335	194	575	860	2,030	575	27	5
9	93	155	194	236	391	194	575	940	2,030	512	27	5
10	93	155	155	236	710	194	640	1,020	2,150	512	27	5
11	122	150	194	236	512	194	575	1,580	2,660	455	27	5
12	122	150	194	285	450	194	640	1,690	3,100	512	27	5
13	122	150	194	236	391	194	710	1,470	1,470	512	16	5
14	122	150	194	335	285	236	780	1,370	1,370	450	13	5
15	122	150	194	335	285	285	780	1,270	1,370	391	10	5
16	122	150	194	285	335	335	710	1,370	1,270	335	7	5
17	122	150	194	236	450	391	710	1,470	1,270	335	7	5
18	122	150	194	236	710	391	710	1,580	1,100	285	7	5
19	122	150	235	236	512	450	860	1,370	1,100	236	7	5
20	122	150	335	236	391	391	1,020	1,180	1,100	194	5	5
21	122	150	450	236	391	391	1,100	1,020	1,020	122	5	10
22	155	150	450	236	391	450	1,020	940	1,020	122	5	16
23	155	150	710	194	391	450	940	940	1,020	122	7	16
24	155	150	860	194	391	512	940	1,020	1,020	93	5	16
25	155	194	860	236	391	575	860	1,020	940	122	5	16
26	155	194	710	236	335	575	940	940	940	122	5	21
27	155	194	640	236	335	575	870	860	780	93	5	21
28	155	194	391	236	335	512	870	1,020	780	122	4	21
29	155	194	285	236	....	512	780	1,580	710	69	4	27
30	155	194	285	285	....	512	860	1,910	710	50	4	27
31	155	....	285	285	....	512	....	2,030	....	50	4	....

Monthly discharge of Carson River near Empire, Nev., for the year ending Sept. 30, 1915.

Month.	Discharge in second-feet.			Run-off (total in acre-feet).
	Maximum.	Minimum.	Mean.	
October	155	50	113	6,960
November	194	150	162	9,640
December	860	155	324	19,900
January	335	194	255	15,700
February	710	285	407	22,600
March	575	194	362	22,300
April	1,100	391	738	43,900
May	2,030	640	1,160	71,300
June	3,100	710	1,510	89,800
July	780	50	373	22,900
August	50	4	17.9	1,100
September	27	5	9.70	577
The year	3,100	4	451	327,000

MARKLEEVILLE CREEK[1] ABOVE MARKLEEVILLE, CAL.

Location.—At highway bridge above mouth of Pleasant Valley Creek, three-fourths of a mile above Markleeville, Alpine County.

Drainage area.—Not measured.

Records available.—November 7, 1911, to September 30, 1915 (fragmentary).

Gage.—Vertical staff in two sections on left abutment of bridge; read by W. J. Clark; datum of gage was raised 5.71 feet, August 18, 1914.

Discharge measurements.—Made from bridge or by wading.

Channel and control.—Bed composed of gravel and small boulders; fairly permanent.

Extremes of discharge.—Maximum stage recorded during year, 3.5 feet at 7 p. m., May 28 (discharge, 540 second-feet); minimum stage, 0.80 foot at 6.30 p. m., September 21 (discharge, 0.5 second-foot).

1911–1915: Maximum stage recorded, 3.5 feet at 7 p. m., May 28, 1915 (discharge, 540 second-feet); minimum stage, 0.80 foot September 22, 1914, September 21, 1915 (discharge, 0.5 second-foot).

Winter flow.—Stage-discharge relation occasionally affected by ice.

Diversions.—Town ditch, which heads above gage, furnishes water for irrigation and domestic supply at Markleeville. A small ditch also diverts water for irrigation on Hot Springs ranch.

Regulation.—Not known.

Accuracy.—Records good when gage is read.

Cooperation.—Gage-height record furnished by United States Forest Service.

Discharge measurements of Markleeville Creek above Markleeville, Cal., during the year ending Sept. 30, 1915.

[Made by H. J. Tompkins.]

Date.	Gage height.	Discharge.	Date.	Gage height.	Discharge.
	Feet.	*Sec.-ft.*		*Feet.*	*Sec.-ft.*
Dec. 2	1.10	3.4	Aug. 6	0.96	2.1
Mar. 24	1.86	49			

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[1] Locally known as Hot Springs Creek.

Daily discharge, in second-feet, of Markleeville Creek above Markleeville, Cal., for the year ending Sept. 30, 1915.

Day.	Oct.	Nov.	Dec.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.
1	1.2						345			
2			3.5			86	275			
3							245			
4	1.2						245			
5	1.2	1.2					215			
6	1.2					54			1.2	
7							245			0.8
8					54					
9					60					1.0
10	1.2				68		245			.8
11									1.2	.9
12	1.2				115		185			
13	1.2	2.5			76				1.2	
14	1.2				60	135				.8
15					68	135	160		1.2	.8
16	1.2				86		185			
17	1.5				115					
18	1.5	3.5				160		14		
19					185			14		
20	2.5							16		
21	1.5				135		148	14		.5
22	1.5					115		16		
23	1.5							14		
24	1.5			55	105		115			
25										
26					95		91	9		
27					105		95	7.2		
28	1.5					540	76			
29	2.5				115					
30						275				1.0
31						310				

NOTE.—Discharge determined from a fairly well defined rating curve. Ice reported present Nov. 23-30; Dec. 13 water flowing over top of ice; gage height, 1.35 feet; discharge not determined.

MARKLEEVILLE CREEK AT MARKLEEVILLE, CAL.

LOCATION.—In the SE. ¼ sec. 21, T. 10 N., R. 20 E., at highway bridge at Markleeville, Alpine County, three-fourths mile below junction with Pleasant Valley Creek.

DRAINAGE AREA.—Not measured.

RECORDS AVAILABLE.—November 11, 1910, to September 30, 1915 (fragmentary).

GAGE.—Vertical staff on left abutment of highway bridge near downstream end; read by W. J. Clark.

DISCHARGE MEASUREMENTS.—Made from bridge or by wading.

CHANNEL AND CONTROL.—Bed composed of gravel and boulders; somewhat shifting during high water. Banks high and not subject to overflow. Point of zero flow, about gage height 1.0 foot.

EXTREMES OF DISCHARGE.—Maximum stage recorded during year, 4.2 feet at 10.15 a. m. June 1 (discharge, 700 second-feet); minimum stage, 0.80 foot at 9.15 a. m. September 22 and 23 (discharge, 4 second-feet).

1910–1915: Maximum stage recorded, 5.3 feet June 15, 1912 (discharge, 915 second-feet); minimum stage, 0.70 foot September 20, 1913 (discharge, 3 second-feet). Flood of March, 1907, reached stage about 9 feet.

WINTER FLOW. Stage-discharge relation affected by ice.

DIVERSIONS.—See Markleeville Creek near Markleeville. Water is also diverted from Pleasant Valley Creek for irrigation.

REGULATION.—Diversions partly regulate flow. Some storage has been developed on Pleasant Valley Creek.

ACCURACY.—Records considered good when gage is read.

COOPERATION.—Gage-height record furnished by United States Forest Service.

Discharge measurements of Markleeville Creek at Markleeville, Cal., during the year ending Sept. 30, 1915.

[Made by H. J. Tompkins.]

Date.	Gage height.	Discharge.	Date.	Gage height.	Discharge.
	Feet.	*Sec.-ft.*		*Feet.*	*Sec.-ft.*
Dec. 2	[a]1.12	11	Aug. 6	1.06	7.8
Mar. 24	2.31	108			

[a] Some ice on control. Stage-discharge relation not affected.

Daily discharge, in second-feet, of Markleeville Creek at Markleeville, Cal., for the year ending Sept. 30, 1915.

Day.	Oct.	Nov.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.
1	10					700			
2					150		190		
3						507	150	14	
4						507			
5	24	9					125		
6	21	11			110			8.2	
7						507		9	
8				89				6	
9				103					4.5
10				117	464	507		7	4.5
11					387	352			4.5
12	11	10		190		352			
13	11	10		160					4.5
14	24			125					4.8
15				125	263			21	4.5
16	16	10		170		320		24	
17	12			212	387	352			
18							46		
19	10			320					
20	12						38		
21	11			290					
22	8				263	600			4
23	11			212	263	250			4
24	10		104		464	201	46		7
25									
26				190	387	170	38		7
27				190			34		
28	10					160			
29	8			224		150			4.5
30	10				600	150			4
31	9								

NOTE.—Discharge determined from a fairly well defined rating curve. Ice reported present Nov. 18 to Dec. 31; data insufficient for determinations of discharge.

WEST FORK OF CARSON RIVER AT WOODFORDS, CAL.

LOCATION.—In the SE. ¼ sec. 34, T. 11 N., R. 19 E., above highway bridge at Woodfords, Alpine County.

DRAINAGE AREA.—70 square miles.

RECORDS AVAILABLE.—April, 1890, to March, 1892; October 18, 1900, to September 30, 1915.

GAGE.—Vertical staff in two sections on left bank just above highway bridge; read by an employee of United States Reclamation Service; vertical staff on right bank, at approximately same site but different datum, November 11, 1913, to August 21, 1914; vertical staff on left bank 20 feet downstream, June 8, 1907, to November 10, 1913, except for certain periods in 1910 and 1911, when gage at cable was read; vertical staff on left bank at cable half a mile above highway bridge, October 18, 1900, to May 18, 1907; original gage near present site used April, 1890, to March, 1892.

DISCHARGE MEASUREMENTS.—Made from cable half a mile above gage or by wading.

Channel and control.—Bed composed of fine gravel and boulders; section rough and fairly permanent.

Extremes of discharge.—Maximum stage recorded during year, 4.0 feet May 11, June 6 and 7 (discharge, 672 second-feet); minimum stage, 0.8 foot July 30, 31, August 8, 9, 12–15, 29, September 6–12 and 21–26 (discharge, 8 second-feet).

1900–1915: Maximum stage recorded, 6.8 feet, May 9 and 10, 1906 (discharge, 1,570 second-feet); minimum stage, 0.8 foot (see above).

Winter flow.—Stage-discharge relation only slightly affected by ice.

Diversions.—Three irrigation ditches head between cable and gage. Their discharges are not included in record.

Regulation.—Flow partially regulated by diversions.

Accuracy.—Records fair.

Cooperation.—Gage-height record furnished by United States Reclamation Service.

Discharge measurements of West Fork of Carson River at Woodfords, Cal., during the year ending Sept. 30, 1915.

[Made by H. J. Tompkins.]

Date.	Gage height.	Discharge.	Date.	Gage height.	Discharge.
	Feet.	*Sec.-ft.*		*Feet.*	*Sec.-ft.*
Dec. 3	1.30	29	Aug. 7	1.50	44
Mar. 25	1.62	53			

Daily discharge, in second-feet, of West Fork of Carson River at Woodfords, Cal., for the year ending Sept. 30, 1915.

Day.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.
1	23	44	29	32	36	32	92	209	602	209	14	18
2	23	[a]40	29	32	36	32	92	233	602	209	[a]14	18
3	23	36	29	32	36	32	100	209	[a]620	209	14	18
4	[a]23	36	29	[a]34	[a]34	32	92	233	637	209	18	18
5	[a]23	[a]36	29	36	32	29	92	233	[a]654	186	[a]16	18
6	[a]23	36	29	36	32	29	100	258	672	186	14	8
7	23	36	29	40	29	32	125	[a]285	672	186	44	8
8	23	[a]36	29	44	36	32	125	312	637	186	8	8
9	23	36	[a]29	[a]40	40	[a]34	108	467	[a]620	[a]175	8	8
10	23	36	[a]29	36	32	36	125	534	602	164	[a]8	8
11	[a]21	36	29	40	32	32	144	672	534	164	[a]8	8
12	[a]20	36	29	36	32	36	154	602	467	77	8	8
13	18	[a]36	29	48	29	36	175	534	[a]450	[a]72	8	18
14	18	[a]36	29	36	29	36	186	500	434	[a]67	8	18
15	[a]16	36	29	32	29	32	233	568	[a]402	[a]63	8	18
16	14	36	29	32	36	36	284	602	371	[a]58	18	18
17	18	[a]36	29	32	48	36	341	602	371	53	18	18
18	23	36	29	[a]30	36	40	402	602	341	53	18	18
19	23	36	29	29	32	44	341	602	[a]332	53	18	18
20	[a]25	36	29	32	26	48	341	[a]579	[a]322	36	18	18
21	[a]27	36	32	32	29	53	312	[a]557	312	[a]30	18	8
22	29	36	32	32	29	53	312	534	284	23	18	8
23	29	36	29	[a]30	26	58	312	467	258	18	11	8
24	36	36	29	29	[a]29	64	312	467	[a]246	[a]16	11	8
25	36	36	29	26	32	64	326	467	233	14	11	8
26	[a]39	36	32	29	32	70	312	534	209	11	11	8
27	[a]41	36	32	29	32	77	312	[a]534	[a]209	[a]10	11	14
28	44	36	36	32	32	92	284	534	209	[a]10	11	14
29	44	29	32	29	......	108	246	568	209	[a]9	8	14
30	44	29	32	32	......	100	246	568	209	8	18	14
31	44	......	32	40	......	100	......	602	......	8	18	......

[a] Interpolated.

Note.—Discharge determined from a fairly well defined rating curve. Ditches diverting water above gage July 12, Aug. 8–15, 23–29, Sept. 6–12 and 21–26.

Monthly discharge of West Fork of Carson River at Woodfords, Cal., for the year ending Sept. 30, 1915.

[Drainage area, 70 square miles.]

Month.	Discharge in second-feet.				Run-off.		Accuracy.
	Maximum.	Minimum.	Mean.	Per square mile.	Depth in inches on drainage area.	Total in acre-feet.	
October	44	14	27.1	0.387	0.45	1,670	C.
November	44	29	35.9	.513	.57	2,140	C.
December	36	29	29.9	.427	.49	1,840	C.
January	48	26	33.8	.483	.56	2,080	C.
February	48	26	32.6	.466	.49	1,810	C.
March	108	29	49.5	.707	.82	3,040	B.
April	402	92	221	3.16	3.53	13,200	B.
May	672	209	473	6.76	7.79	29,100	C.
June	672	209	424	6.06	6.76	25,200	C.
July	209	8	89.4	1.28	1.48	5,500	C.
August	44	8	14.0	.200	.23	861	D.
September	18	8	13.1	.187	.21	780	D.
The year	672	8	120	1.71	23.38	87,200	

HUMBOLDT RIVER BASIN.

HUMBOLDT RIVER AT PALISADE, NEV.

Location.—In sec. 36, T. 32 N., R 51 E., at highway bridge at Palisade, Eureka County, 100 feet below Southern Pacific Railroad bridge and about a mile above mouth of Pine Creek.

Drainage area.—5,010 square miles.

Records available.—November 27, 1902, to October 19, 1906; July 26, 1911, to September 30, 1915.

Gage.—Chain gage at highway bridge December 1, 1911, to September 30, 1915; read once daily by Albina Siri; datum same as that of inclined staff on left bank near Southern Pacific Railroad bridge, read from July 26 to November 30, 1911. Original gage was a vertical staff on right abutment of the highway bridge which was destroyed by high water in 1910. No determined relation between the original and present datum.

Discharge measurements.—Made from cable about one-eighth mile above gage or by wading.

Channel and control.—Bed composed of sand and gravel; control fairly permanent; one channel at all stages. Point of zero flow, about gage height 0.4 foot.

Extremes of discharge.—Maximum stage recorded during year, 3.0 feet at 2.15 p. m. June 12 (discharge, 382 second-feet); minimum stage, 0.96 foot August 28 to September 1 (discharge, 12 second-feet).

1903–1906; 1911–1915; Maximum stage recorded, 7.5 feet January 25, 1914 (discharge, 2,780 second-feet); minimum stage, 0.96 foot August 28 to September 1, 1915 (discharge, 12 second-feet).

Winter flow.—Stage-discharge relation slightly affected by ice.

Diversions.—Some water diverted for irrigation in valley above canyon.

Regulation.—Flow affected by irrigation diversions above.

Accuracy.—Records good.

Discharge measurements of Humboldt River at Palisade, Nev., during the year ending Sept. 30, 1915.

Date.	Made by—	Gage height.	Discharge.	Date.	Made by—	Gage height.	Discharge.
		Feet.	*Sec.-ft.*			*Feet.*	*Sec.-ft.*
Oct. 7	L. W. Jordan	1.90	85	May 11[a]	A. B. Purton	2.08	128
Dec. 11	.....do	2.15	113	July 15	.....do	1.48	53
Feb. 13	.....do	2.30	149	Aug. 19	.....do	1.02	15.1
May 11	A. B. Purton	2.09	136	19	.....do	1.02	14.8

[a] Measured about half a mile below gage.

Daily discharge, in second-feet, of Humboldt River at Palisade, Nev., for the year ending Sept. 30, 1915.

Day.	Oct.	Nov.	Dec.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.
1	62	149	114	72	283	343	136	176	119	28	12
2	73	149	114	72	254	343	136	224	119	27	14
3	73	149	114	73	254	343	136	346	119	26	14
4	73	149	114	73	257	343	136	346	104	24	13
5	86	149	114	73	257	346	136	312	90	23	13
6	86	149	114	73	257	346	155	312	90	21	13
7	93	149	113	73	257	312	176	346	90	20	13
8	100	149	112	73	260	312	155	346	77	19	14
9	114	149	110	86	260	312	155	346	77	19	14
10	114	149	108	86	260	280	136	346	77	19	14
11	114	149	106	86	260	280	136	346	77	18	14
12	114	149	102	86	263	251	119	382	77	18	14
13	114	149	98	149	263	251	119	346	77	18	14
14	114	149	94	149	263	251	119	312	65	18	14
15	114	149	90	149	263	224	104	312	52	16	14
16	114	131	85	172	266	224	104	280	48	16	15
17	114	131	......	172	266	224	119	280	44	15	15
18	114	114	......	219	266	224	155	280	41	15	15
19	114	100	......	219	266	199	176	251	39	15	15
20	131	100	......	222	268	199	199	224	38	15	15
21	131	86	......	248	268	176	224	199	40	14	13
22	131	100	......	248	268	176	224	176	44	14	13
23	131	100	......	248	268	176	251	176	46	13	13
24	131	100	......	251	302	155	251	155	40	13	12
25	131	114	......	280	302	155	224	155	37	13	15
26	131	114	......	280	302	155	199	155	33	13	19
27	149	131	......	280	302	155	199	136	32	13	18
28	149	131	......	283	306	136	199	136	32	12	44
29	140	131	......	......	339	136	176	119	29	12	48
30	149	114	......	......	339	136	176	119	29	12	48
31	149	......	......	......	339	......	176	......	29	12	......

NOTE.—Discharge determined as follows: Oct. 1 to Feb. 15 from a rating curve well defined between 50 and 200 second-feet; Feb. 16 to Apr. 4 by indirect method for shifting control; Apr. 5 to Sept. 30 from a rating curve well defined between zero and 400 second-feet. Discharge estimated, because of ice, from observer's notes, one discharge measurement, and climatic records, Dec. 7-16 as in table; Dec. 17-31, 80 second-feet; Jan. 1-31, 75 second-feet.

Monthly discharge of Humboldt River at Palisade, Nev., for the year ending Sept. 30, 1915.

Month.	Discharge in second-feet.			Run-off (total in acre-feet).	Accuracy.
	Maximum.	Minimum.	Mean.		
October	149	62	115	7,070	B.
November	140	86	131	7,800	B.
December	114	....	93.6	5,760	C.
January	....	....	75.0	4,610	D.
February	283	72	161	8,940	C.
March	339	254	277	17,000	B.
April	346	136	239	14,200	B.
May	251	104	165	10,100	B.
June	382	119	255	15,200	B.
July	119	29	61.6	3,790	B.
August	28	12	17.1	1,050	B.
September	48	12	17.4	1,040	B.
The year	382	12	133	96,600	

HUMBOLDT RIVER NEAR GOLCONDA, NEV.

Location.—In sec. 21, T. 36 N., R. 40 E., at highway bridge about 1¼ miles northwest of Golconda, Humboldt County, and 12 miles above mouth of Little Humboldt River.

Drainage area.—10,800 square miles.

Records available.—October 24, 1894, to December 31, 1909; September 8, 1910, to September 30, 1915.

Gage.—Chain gage on downstream side of bridge near right bank, installed November 5, 1910; read once daily by Florence Bernard. Several gages at various datums and at various sites used prior to this date.

Discharge measurements.—Made from highway bridge at gage or by wading.

Channel and control.—Bed composed of loose sand; control shifts occasionally. One channel at all stages. Point of zero flow about gage height 1.7 feet.

Extremes of discharge.—Maximum stage recorded during year, 5.9 feet at 12.30 p. m. April 6 (discharge, 352 second-feet); minimum stage, 1.75 feet September 11–26 (discharge, 0.2 second-foot).

1900–1915: Maximum stage recorded, 16.6 feet April 3, 5, 6, 8, 10, 13, 15, 17, 20, 22, 24, 27, 29, and May 1, 1907 (discharge, 3,160 second-feet); minimum stage, 2.7 feet January 2, 4, 6, 9, 10, 11, and 17, 1906 (discharge, zero).

Winter flow.—Stage-discharge relation slightly affected by ice.

Diversions.—Considerable water is diverted above station.

Regulation.—Low-water flow regulated by following diversion dams, which provide practically no storage: Bernards dam, rock and brush, half a mile above gage; Anderson's dam, rock, and brush, 1¼ miles above; Taylor and Sheehan dam, concrete spillway with flashboards, small power plant with develops power for pumping into high-line canal; Pinson's dam, rock and brush, about 5 miles above gage.

Accuracy.—Records fair. Owing to regulation by irrigation diversions, one gage reading a day probably does not give accurate determinations.

Discharge measurements of Humboldt River near Golconda, Nev., during the year ending Sept. 30, 1915.

Date.	Made by—	Gage height.	Dis-charge.	Date.	Made by—	Gage height	Dis-charge.
		Feet.	*Sec.-ft.*			*Feet*	*Sec.-ft.*
Oct. 6	L. W. Jordan	2.67	21.8	May 14	A. B. Purton	3.13	43.3
Dec. 10	.....do	3.96	105	July 2	L. W. Jordan	2.01	1.8
Feb. 12	.....do	4.15	110	15	A. B. Purton	1.96	1.3
May 14	A. B. Purton	3.14	43.6				

Daily discharge, in second-feet, of Humboldt River near Golconda, Nev., for the year ending Sept. 30, 1915.

Day.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.
1	19	62	76	87	87	161	161	53	31	1.0	0.7	0.4
2	19	56	76	87	87	161	184	53	31	2.0	.7	.4
3	19	53	80	91	87	161	210	53	9	2.0	.7	.4
4	19	56	80	91	84	161	253	47	9	2.0	.7	.4
5	19	56	84	91	91	161	299	59	9	2.0	.7	.4
6	21	59	84	91	91	161	352	59	9	2.0	.7	.4
7	21	59	84	91	95	172	299	53	9	2.0	.7	.4
8	23	66	87	91	95	172	238	53	6	1.5	.4	.4
9	23	66	95	91	95	172	253	53	6	1.5	.4	.4
10	23	73	99	91	95	172	253	41	6	1.5	.4	.4
11	23	80	95	91	108	172	283	41	6	1.4	.4	.2
12	23	84	87	91	112	172	283	41	4	1.4	.4	.2
13	21	87	87	91	103	172	268	41	4	1.3	.4	.2
14	21	87	......	91	121	161	253	44	4	1.3	.4	.2
15	21	80	......	91	121	140	150	53	4	1.3	.4	.2
16	21	66	......	91	130	130	112	53	2	1.0	.4	.2
17	21	66	......	96	140	112	112	47	2	1.0	.4	.2
18	20	47	......	99	150	130	140	41	2	1.0	.4	.2
19	20	36	......	96	150	150	184	41	2	1.0	.4	.2
20	23	27	......	96	150	150	184	41	2	1.0	.4	.2
21	27	27	......	96	150	150	184	36	2	1.0	.4	.2
22	29	36	......	99	140	156	172	36	2	1.0	.4	.2
23	31	53	......	99	140	161	172	36	2	1.0	.4	.2
24	34	50	......	99	140	161	172	36	2	1.0	.4	.2
25	238	59	......	99	150	161	140	36	2	.7	.4	.2
26	150	66	......	95	161	150	53	36	2	.7	.4	.2
27	103	66	......	96	161	140	53	36	2	.7	.4	.4
28	59	73	91	96	161	140	53	36	2	.7	.4	.4
29	59	73	87	95	......	150	53	36	1	.7	.4	.4
30	59	73	87	95	......	150	53	31	1	.7	.4	.4
31	62	......	87	87	......	161	......	31	......	.7	.4	......

Note.—Discharge determined from a rating curve well defined from zero to 200 second-feet, and fairly well defined from 200 to 400 second-feet. Flow estimated, on account of ice, from observer's notes and climatic records Dec. 14 to 27, 85 second-feet.

Monthly discharge of Humboldt River near Golconda, Nev., for the year ending Sept. 30, 1915.

Month.	Discharge in second-feet.			Run-off (total in acre-feet).	Accuracy.
	Maximum.	Minimum.	Mean.		
October	238	19	41.0	2,520	B.
November	87	27	61.7	3,670	B.
December	99	76	85.7	5,270	C.
January	99	87	93.1	5,720	C.
February	161	84	121	6,720	B.
March	172	112	156	9,590	B.
April	352	53	186	11,100	B.
May	59	31	43.6	2,680	B.
June	31	1	5.83	347	C.
July	2.0	.7	1.23	76	D.
August	.7	.4	.47	29	D.
September	.4	.2	.29	17	D.
The year	352	.2	65.9	47,700	

HUMBOLDT RIVER NEAR OREANA, NEV.

Location.—In sec. 35, T. 29 N., R. 32 E., about 2 miles above highway bridge near J. J. McCarthy's ranch and 2 miles southwest of Oreana (railroad station called Nenzel), Humboldt County.

Drainage area.—13,800 square miles (measured on map issued by General Land Office).

Records available.—January 27, 1896, to December 31, 1909; September 7, 1910, to September 30, 1915.

Gage.—Friez water-stage recorder on right bank February 24 to August 22, 1914, and October 4, 1914, to September 30, 1915; original gage, vertical staff, nailed to right abutment of old highway bridge, was installed January 27, 1896, and washed out May 26, 1897. A temporary gage was used until September 7, 1897; September 8 a new inclined staff gage was installed on left bank about 1½ miles above old bridge and opposite the railroad section house. This gage washed out in 1902. A vertical staff gage fastened to piling of old Lovelock Valley dam, at the same datum and presumably at the same site as the inclined gage, was read from November 29, 1902, until December 31, 1909, when station was discontinued. The datum was lowered 2.0 feet October 1, 1904. Station was reestablished September 7, 1910, a temporary gage, at a new datum, 150 feet above bridge, being used until November 9, 1910; then a permanent vertical staff gage was installed at the highway bridge, which was read Navember 9, 1910, to February 23, 1914, and August 23 to October 3, 1914.

Discharge measurements.—Made from cable 20 feet below gage or by wading.

Channel and control.—Bed composed of sand; principal control not well defined, but is probably about half a mile below gage, where bed is composed of firm clay; fairly permanent; low-water control is about 50 feet below gage. Point of zero flow about at gage height 0.3 foot. Right bank high and moderately clean; left bank not likely to overflow, but subject to caving.

Extremes of discharge.—Maximum stage recorded during year, 2.65 feet at 3.20 p. m. May 1 (discharge, 322 second-feet); minimum stage (river dry in August and September).

1896–1915: Maximum stage recorded, 12.0 feet May 12, 1897 (discharge, 8,050 second-feet); minimum stage (river dry in June and July, 1905, and in August and September, 1915).

Winter flow.—Stage-discharge relation seriously affected by ice; discharge estimated from measurements, observer's notes, and climatic records.

Diversions.—Station is above all diversions for the Lovelock district, but considerable water is diverted above the station for direct irrigation and storage.

Regulation.—Flow is affected by water stored and released by the Humboldt-Lovelocks Irrigation, Light & Power Co., at its reservoirs a few miles up the river near Humboldt.

Accuracy.—Records good except during winter.

Discharge measurements of Humboldt River near Oreana, Nev., during the year ending Sept. 30, 1915.

Date.	Made by—	Gage height.	Discharge.	Date.	Made by—	Gage height.	Discharge.
		Feet.	*Sec.-ft.*			*Feet.*	*Sec.-ft.*
Oct. 5	L. W. Jordan	0.92	31.5	May 14	L. H. Taylor	1.41	80
Dec. 7	do	.88	26.8	15	A. B. Purton	1.39	84
Feb. 10	do	[a]1.56	75	23	L. H. Taylor	1.56	104
Apr. 11	L. H. Taylor[b]	1.43	75	June 16	L. W. Jordan	1.80	143
14	do	[c]2.02	200	July 16	A. B. Purton	.94	20
26	L. W. Jordan	2.28	244	16	do	.94	20.4
27	L. H. Taylor	2.27	226				

[a] Stage-discharge relation affected by ice.
[b] Humboldt-Lovelocks Irrigation, Light & Power Co. engineer.
[c] Read on recorder sheet.

Daily discharge, in second feet, of Humboldt River near Oreana, Nev., for the year ending Sept. 30, 1915.

Day.	Oct.	Nov.	Dec.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.
1	38	60	57		189	202	318	114	95	1.4	
2	38	58	44		228	200	256	127	106	1.3	
3	32	54	59		252	163	216	125	105	1.0	
4	32	43	44		216	140	194	122	165	.8	
5	30	37	34		200	122	167	120	108	.6	
6	28	35	31		200	102	133	124	122	.4	
7	27	40	28		210	92	116	120	124	.1	
8	27	47			214	88	102	119	108	.1	
9	26	46			214	82	105	124	105	.1	
10	25	46		75	212	85	100	144	100		
11	24	46			212	80	96	141	91		
12	24	47			214	135	98	144	75		
13	23	48	46		210	179	105	144	66		
14	22	48	31		214	185	96	144	38		
15	22	47		143	212	177	88	146	25		
16	21	49		154	212	187	88	146	20		
17	20	49		161	194	206	100	146	16		
18	20	46		160	200	200	105	140	14		
19	19	46		154	196	200	102	122	12		
20	19	76		161	163	200	102	95	9.0		
21	19	58		168	156	245	110	82	7.6		
22	19	59		172	167	245	110	89	6.0		
23	20	68		174	174	245	110	81	5.2		
24	20	78		179	174	245	111	82	4.0		
25	19	91		181	172	254	119	84	3.4		
26	22	81		176	170	241	111	82	3.0		
27	31	68		174	177	239	124	80	2.6		
28	32	51		176	189	245	141	80	2.0		
29	32	35			185	270	135	89	1.9		1.3
30	37	60			190	300	120	86	1.7		1.5
31	61				200		114		1.6		

Note.—Discharge determined as follows: Oct. 1-3 from poorly defined rating curve, for old gage at highway bridge; Oct. 4 to July 7 from a rating curve well defined between 10 and 300 second-feet; July 8-15 by indirect method for shifting control; July 16 to Sept. 30 from a rating curve fairly well defined below 20 second-feet. Apr. 18-23, recording gage stopped, discharge interpolated; Aug. 10 to Sept. 28 river dry. Discharge estimated, because of ice, from observer's notes, discharge measurements, and climatic records, Dec. 8-12, 27 second-feet; Dec. 15 to Jan. 31, 30 second-feet; Feb. 1-9, 65 second-feet; Feb. 11-14, 100 second-feet.

Monthly discharge of Humboldt River near Oreana, Nev., for the year ending Sept. 30, 1915.

Month.	Discharge in second-feet.			Run-off (total in acre-feet).	Accuracy.
	Maximum.	Minimum.	Mean.		
October	61	19	26.7	1,640	A.
November	91	35	53.9	3,210	A.
December			34.5	2,120	D.
January			30.0	1,840	
February	181		121	6,720	B.
March	252	156	197	12,100	B.
April	300	80	185	11,000	B.
May	318	88	129	7,930	A.
June	146	80	115	6,840	A.
July	124	1.6	47.8	2,940	B.
August	1.4	0	.19	12	
September	1.5	0	.09	5	
The year	318	0	77.9	56,400	

HUMBOLDT RIVER NEAR LOVELOCKS, NEV.

Location.—In the NW ¼ sec. 11, T. 25 N., R. 31 E., about 1,500 feet below dam and reservoir on Big 5 ranch, the lowest diversion for irrigation on Humboldt River, and 9 miles south of Lovelocks, Humboldt County.

Drainage area.—14,200 square miles.

Records available.—February 7, 1912, to September 30, 1915.

Gage.—Lietz water-stage recorder on left bank, on the opposite side of the river and a few feet down stream from inclined gage to which it is referred. Original inclined staff gage on right bank was read February 7 to June 17, 1912, when Lietz gage was installed a few feet below it; Lietz gage washed out June 18, 1914, and was replaced on left bank June 26, 1914.

Discharge measurements.—Made from cable at gage or by wading.

Channel and control.—Bed composed of firm clay, control fairly permanent. One channel at all stages.

Extremes of discharge.—Maximum stage recorded during year, 1.34 feet at 4.45 p. m. March 5 (discharge, 270 second-feet); minimum stage, zero in June, July, August, and September (discharge, estimated 0.05 second-foot).

1912–1915: Maximum stage recorded, 5.15 feet May 4, 1914 (discharge, 1,450 second-feet); minimum stage (channel dry during April, May, and June, 1913).

Winter flow.—Slightly affected by ice.

Diversion.—Below all irrigation diversions.

Regulation.—Flow affected by irrigation diversions and storage.

Accuracy.—Records fair.

Discharge measurements of Humboldt River near Lovelocks, Nev., during the year ending Sept. 30, 1915.

Date.	Made by—	Gage height.	Discharge.	Date.	Made by—	Gage height.	Discharge.
		Feet.	*Sec.-ft.*			*Feet.*	*Sec.-ft.*
Dec. 6	L. W. Jordan	0.31	18.5	May 15	A. B. Purton	0.02	0.1
Feb. 9	.....do	.60	80.4				

Daily discharge, in second-feet, of Humboldt River near Lovelocks, Nev., for the year ending Sept. 30, 1915.

Day.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May.	June.
1	13	10	85		56	175	1	0.5	0.1
2	14	12	16		47	180	1	.5	.1
3	14	19	14		62	190	1		1
4	14	21	16		65	241	1		.05
5	14	19	23		78	238	1		
6	15	21	23		92	198	1		
7	15	20	45		88	183	1		
8	17	16	27		84	180	1		
9	16	10	33		80	180	1		
10	16	17	19		99	180	1		
11	20	22	15		85	180	1		
12	16	20			82	180	1		
13	19	8			80	180	1		
14	21	5			104	180	1		
15	20	5			116	175	1	.1	
16	19	5			93	180	1	.1	
17	16	5			99	177	1	.1	
18	14	5			134	230	1	.1	
19	13	5			136	105	1	.1	
20	12	5			134	68	1	.1	
21	14	6			142	99	.5	.1	
22	15	5			149	99	.5	.1	
23	15	5		20	175	87	.5	.1	
24	14	5			175	45	.5	.1	
25	14	5			190	47	.5	.1	
26	14	5			180	37	.5	.1	
27	17	4			171	34	.5	.1	
28	12	4			162	21	.5	.1	
29	9	17				9	.5	.3	
30	10	75		60		10	.5	.3	
31	10			60		3		.2	

NOTE.—Discharge determined as follows: Oct. 1 to Dec. 11 from a rating curve well defined between zero and 1,200 second-feet; Jan. 30 to Sept. 30 from a rating curve fairly well defined between zero and 250 second-feet; Nov. 29, 30, Dec. 1, 7, Feb. 16, Mar. 19, 20, 23, and 28, by averaging hourly discharge; Feb. 5, 7, 8, 26, 27, and Mar. 9–13 by interpolating discharge; May 3–14, estimated 0.3 second-foot; June 5 to Sept. 30, estimated 0.05 second-foot. Discharge estimated, because of ice, from observer's notes, Dec. 12 to Jan. 22, 20 second-feet; Jan. 24–29, 30 second-feet.

Monthly discharge of Humboldt River near Lovelocks, Nev., for the year ending Sept. 30, 1915.

Month.	Discharge in second-feet.			Run-off (total in acre-feet).	Accuracy.
	Maximum.	Minimum.	Mean.		
October	21	9	14.9	916	C.
November	75	4	12.7	756	C.
December	85		23.1	1,420	
January	60		24.5	1,510	
February	190	47	113	6,280	B.
March	241	3	132	8,120	B.
April	1	0.5	8.33	50	D.
May	0.5	0.1	.22	14	
June	0.1	0.05	.05	3	
July			[a] .05	3	
August			[a] .05	3	
September			[a] .05	3	
The year	241		26.3	19,100	

[a] Estimated.

MARYS RIVER NEAR DEETH, NEV.

Location.—In the NW. ¼ sec. 31, T. 40 N., R. 60 E., at bridge 300 feet east of Malo Vista ranch house of Nevada Land & Livestock Co., and about 20 miles north of Deeth, Elko County.

Drainage area.—355 square miles (measured on map of Nevada issued by General Land Office, 1908 edition).

Records available.—November 24, 1902, to July 14, 1903; January 17, 1912, to September 30, 1915.

Gage.—Chain gage on upstream side of bridge; read once daily by Jess Larson. Original staff gage at same bridge, but with different datum, read November 24, 1902, to July 14, 1903.

Discharge measurements.—Made from bridge at gage or by wading.

Channel and control.—Bed composed of gravel and loose sand, banks below gage subject to caving; control slightly shifting. One channel at all stages.

Extremes of discharge.—Maximum stage recorded during year, 3.7 feet at 4 p. m., March 30 (discharge, 94 second-feet); minimum stage, 2.1 feet August 12 to September 30 (discharge, 1.5 second-feet).

1902–3, 1912–1915: Maximum stage recorded, 6.3 feet May 19 and June 3–7, 1912 (discharge, 439 second-feet); minimum stage, 2.1 feet August 12 to September 30, 1915 (discharge, 1.5 second-feet).

Winter flow.—Stage-discharge relation affected by ice.

Diversions.—Station is below all diversions except one small canal on the Malo Vista ranch and the Cross ranch diversions about 14 miles below.

Regulation. During low-water periods flow is affected by diversion dams above.

Accuracy.—Records fair.

Discharge measurements of Marys River near Deeth, Nev., during the year ending Sept. 30, 1915.

Date.	Made by—	Gage height.	Discharge.	Date.	Made by—	Gage height.	Discharge.
		Feet.	*Sec.-ft.*			*Feet.*	*Sec.-ft.*
Oct. 9	L. W. Jordan	2.79	13.7	Apr. 10	A. B. Purton	3.32	58
Dec. 2[a]	do	2.70	14.5	June 25	do	2.48	10.6
Feb. 3[b]	do	2.60	14.1	Aug. 18	do	2.11	1.5

[a] Complete ice cover below gage.
[b] Overhanging ice—effect probably slight.

Daily discharge, in second-feet, of Marys River near Deeth, Nev., for the year ending Sept. 30, 1915.

Day	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.
1	....	15	75	58	43	19	5	1.5
2	....	15	66	58	50	19	5	1.5
3	....	30	66	36	36	19	3	1.5
4	....	30	84	30	30	19	3	1.5
5	....	19	84	30	30	19	3	1.5
6	....	19	75	19	30	19	3	1.5
7	....	19	84	19	30	19	3	1.5
8	....	19	75	15	24	19	3	1.5
9	....	15	66	15	30	15	3	1.5
10	....	19	58	15	30	11	3	1.5
11	....	15	50	15	30	11	3	1.5
12	....	11	50	15	30	15	1.5	1.5
13	....	15	50	15	30	15	1.5	1.5
14	....	15	58	15	24	11	1.5	1.5
15	....	19	58	19	22	11	1.5	1.6
16	....	24	58	19	19	11	1.5	1.5
17	15	24	50	19	11	11	1.5	1.5
18	15	24	58	24	8	11	1.5	1.5
19	19	36	58	24	3	11	1.5	1.5
20	19	36	58	36	5	11	1.5	1.5
21	19	36	58	43	8	8	1.5	1.5
22	15	43	84	50	8	8	1.5	1.5
23	15	58	66	58	5	8	1.5	1.5
24	19	75	58	58	8	8	1.5	1,5
25	19	75	58	58	8	8	1.5	1.5
26	19	84	50	50	5	8	1.5	1.5
27	19	84	50	50	11	8	1.5	1.5
28	11	84	43	36	19	3	1.5	1.5
29	....	84	43	36	19	8	1.5	1.5
30	....	94	43	36	19	8	1.5	1.5
31	....	84	....	36	....	8	1.5	....

NOTE.—Discharge determined as follows: Feb. 17 to Sept. 30, from a rating curve well defined between zero and 100 second-feet; estimated from current-meter measurements, Oct. 1 to No.v 24, 14, second-feet. Estimated because of ice, from observer's note and discharge measurements as follows: Nov. 25–30, 8 second-feet; Dec. 1 to Jan. 31, 6 second-feet; Feb. 1-16, 13 second-feet.

Monthly discharge of Marys River near Deeth, Nev., for the year ending Sept. 30, 1915.

Month.	Discharge in second-feet. Maximum.	Discharge in second-feet. Minimum.	Discharge in second-feet. Mean.	Run-off (total in acre-feet).	Accuracy.
October	....	....	[a] 14.0	861	B.
November	....	....	[a] 12.8	762	C.
December	....	....	[a] 6.0	369	D
January	....	....	[a] 6.0	369	D.
February	42	....	14.7	816	C.
March	94	11	39.4	2,420	B.
April	84	43	61.2	3,640	B.
May	58	15	32.5	2,000	B.
June	50	5	21.0	1,250	B.
July	19	8	12.4	762	B.
August	5	1.5	2.16	133	C.
September	1.5	1.5	1.50	89	C.
The year	94	1.5	18.6	13,500	

[a] Estimated.

STARR CREEK NEAR DEETH, NEV.

LOCATION.—In NE. ¼ sec. 12, T. 36 N., R. 59 E., at highway bridge 2 miles above mouth and about 3 miles southeast of Deeth, Elko County; below all large tributaries except Boulder Creek.

DRAINAGE AREA.—Not measured.

RECORDS AVAILABLE.—June 4, 1913, to September 30, 1915.

Gage.—Vertical staff nailed to upstream pile of bridge bent near right bank; read once daily by G. E. Weathers.

Discharge measurements.—Made by wading.

Channel and control.—Bed composed of small gravel. Control is gravel bar; shifts occasionally. Gage height of zero flow, about 2.0 feet. One channel, except at extremely high stages, when part of the flow passes under an auxiliary bridge.

Extremes of discharge.—Maximum stage recorded during year, 3.55 feet at 9.20 a. m. June 1 (discharge, 62 second-feet); minimum stage, 2.45 feet September 4, 6, 7, 9, 10, and 11 (discharge, 1.6 second-feet).

1913–1915: Maximum stage recorded, 5.6 feet June 4, 1914 (discharge, 372 second-feet); minimum stage, 2.45 feet September 4, 6, 7, 9, 10, and 11, 1915 (discharge, 1.6 second-feet).

Winter flow.—Stage-discharge relation slightly affected by ice.

Diversions.—Station is below practically all diversions from Starr Creek.

Regulation.—Some variation in daily flow at times, caused by diversions for irrigation.

Accuracy.—Records fair.

Discharge measurements of Starr Creek near Deeth, Nev., during the year ending Sept. 30, 1915.

Date.	Made by—	Gage height.	Discharge.	Date.	Made by—	Gage height.	Discharge.
		Feet.	*Sec.-ft.*			*Feet.*	*Sec.-ft.*
Oct. 10	L. W. Jordan..........	2.91	12.3	Apr. 10	A. B. Purton..........	2.80	10.5
Dec. 2	.....do..................	2.80	7.7	June 21	.....do..................	2.88	14
Feb. 4	.....do..................	2.76	9.1	Aug. 19	.....do..................	2.55	3.35

Daily discharge, in second-feet, of Starr Creek near Deeth, Nev., for the year ending Sept. 30, 1915.

Day.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.
1	9.6	9.6	9.0	....	8.8	15	15	15	62	8.8	3.3	2.3
2	12	9.6	8.5	....	8.8	15	15	15	58	7.9	3.3	2.3
3	14	9.6	....	....	8.8	15	15	13	54	7.0	3.3	2.3
4	12	9.6	....	....	8.8	15	15	10	37	7.0	3.3	1.6
5	11	9.6	....	....	8.8	16	14	8.8	41	5.6	3.3	1.6
6	9.6	9.6	....	....	8.8	18	13	8.8	37	4.3	3.3	1.6
7	9.6	9.6	....	....	10	15	13	8.8	37	4.3	3.3	1.6
8	12	9.6	....	....	10	15	13	8.8	37	2.3	3.3	1.6
9	16	9.6	....	....	10	15	13	8.8	41	2.3	3.3	1.6
10	13	9.6	....	....	10	15	11	8.8	45	2.3	3.3	1.6
11	12	9.6	....	....	13	14	10	8.8	49	2.3	3.3	1.6
12	12	9.6	....	....	12	13	12	8.8	45	2.3	2.8	....
13	12	9.6	....	10	10	15	13	8.8	45	2.3	2.3	....
14	12	9.6	....	10	10	18	15	8.8	41	2.3	2.3	....
15	11	9.6	....	10	10	15	13	8.8	37	2.3	2.3	....
16	9.6	9.6	....	10	10	15	10	8.8	32	2.3	2.3	....
17	9.6	11	....	8.8	10	15	10	10	26	2.8	2.3	....
18	12	12	....	9.4	13	16	10	18	26	3.3	2.3	....
19	12	12	....	10	12	18	10	23	26	3.3	2.3	....
20	12	12	....	10	10	15	10	18	24	3.3	2.3	....
21	12	11	....	10	13	13	10	18	21	3.3	2.3	....
22	12	9.6	....	10	15	13	13	13	18	3.3	2.3	....
23	12	9.6	....	10	15	13	10	13	20	3.3	2.3	....
24	12	9.6	....	8.8	18	13	10	13	18	3.3	2.3	....
25	12	9.6	....	10	16	13	10	13	16	3.3	2.3	....
26	11	9.6	....	8.8	15	13	10	15	15	3.3	2.3	....
27	9.6	9.6	....	8.8	13	13	10	15	13	3.3	2.3	....
28	9.6	9.6	....	8.8	14	13	8.8	13	13	3.3	2.3	....
29	9.6	9.6	....	8.8	....	13	8.8	[illegible]	11	3.3	2.3	....
30	9.6	9.6	....	8.8	....	13	15	[illegible]	[illegible]	[illegible]	2.3	....
31	9.6	....	....	....	....	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	....

Note.—Discharge determined as follows: Oct. 1 to
and 80 second-feet; Jan. 13 to Sept. 30 from a rating
Sept. 12–30 flow estimated because of lack of gage re
on which gage was not read. Discharge estimat
measurements, Dec. 3 to Jan. 12, 8 second-feet.

Monthly discharge of Starr Creek near Deeth, Nev., for the year ending Sept. 30, 1915.

Month.	Discharge in second-feet.			Run-off (total in acre-feet).	Accuracy.
	Maximum.	Minimum.	Mean.		
October	16	9.6	11.4	701	B.
November	12	9.6	9.93	591	B.
December	....	....	8.05	495	C.
January	10	....	8.90	530	C.
February	18	8.8	11.5	639	B.
March	18	13	14.6	898	B.
April	15	8.8	11.9	708	B.
May	34	8.8	13.0	799	B.
June	62	8.8	31.8	1,890	B.
July	8.8	2.3	3.70	228	C.
August	3.3	2.3	2.67	164	C.
September	....	1.6	1.92	114	C.
The year	62	1.6	10.7	7,760	

LAMOILLE CREEK NEAR LAMOILLE, NEV.

Location.—In sec. 6, T. 32 N., R. 58 E., about 50 feet below tailrace of Elko-Lamoille Power Co. plant, 50 feet above first irrigation diversion, about 2 miles above Lamoille, and 22 miles southeast of Elko, Elko County.

Drainage area.—About 14 square miles (measured on maps issued by United States Forest Service).

Records available.—May 8 to September 30, 1915.

Gage.—Vertical staff on left bank, read twice daily by E. Galloway.

Discharge measurements.—Made by wading.

Channel and control.—Bed composed of gravel and large boulders; control shifts with extreme high water. One channel at all stages.

Extremes of discharge.—Maximum stage recorded during year, 1.94 feet at 7 p. m. June 9 (discharge, 315 second-feet); minimum stage, 0.51 foot September 21, 22, and 23 (discharge, 2.5 second-feet).

Winter flow.—Stage-discharge relation seriously affected by ice.

Diversions.—Above all irrigation diversions. Water is diverted for Elko-Lamoille Power Co. plant, but returned to stream about 50 feet above gage.

Regulation.—A daily fluctuation occurs during the days when power plant is not in continuous operation.

Accuracy.—Records good.

Discharge measurements of Lamoille Creek near Lamoille, Nev., during the year ending Sept. 30, 1915.

[Made by A. B. Purton.]

Date.	Gage height.	Discharge.	Date.	Gage height.	Discharge.	Date.	Gage height.	Discharge.
	Feet.	*Sec.-ft.*		[illegible]	*Sec.-ft.*		*Feet.*	*Sec.-ft.*
May 8	1.11	38.9	June 23	[illegible]	195	Aug. 31	0.59	5.5
Do	1.12	39.8	June 24	[illegible]	113			
May 23	1.35	70	Aug. 17	[illegible]	7.7			

Daily discharge, in second-feet, of Lamoille Creek near Lamoille, Nev., for the year ending Sept. 30, 1915.

Day.	May.	June.	July.	Aug.	Sept.	Day.	May.	June.	July.	Aug.	Sept.
1	......	204	108	18	6.0	16	89	153	39	8.2	4.8
2	......	137	95	18	5.2	17	98	168	36	7.8	4.8
3	......	114	95	16	4.8	18	84	173	33	7.8	4.8
4	......	101	81	15	4.8	19	76	150	31	7.8	4.2
5	......	116	79	15	4.8	20	73	150	30	6.4	4.2
6	......	136	67	14	5.5	21	69	157	28	6.8	3.5
7	......	174	68	13	4.8	22	71	157	28	6.8	3.5
8	41	224	65	12	4.8	23	71	160	28	7.3	3.5
9	44	283	60	11	4.2	24	76	160	26	6.8	3.5
10	46	270	57	10	4.5	25	75	116	25	6.8	4.2
11	52	173	57	9.6	4.8	26	73	108	24	5.5	4.2
12	61	119	57	9.6	4.8	27	82	108	22	5.2	4.2
13	73	102	54	9.1	4.8	28	102	108	22	5.2	4.2
14	71	111	46	9.1	4.8	29	124	114	21	4.8	4.5
15	71	146	42	8.6	4.8	30	147	108	19	4.8	3.5
						31	180	......	19	4.5	......

NOTE.—Discharge determined as follows: May 8–28 from a rating curve well defined between 40 and 100 second-feet; May 29 to June 10 by indirect method for shifting control; June 11 to Sept. 30 from a rating curve well defined between zero and 300 second-feet.

Monthly discharge of Lamoille Creek near Lamoille, Nev., for the year ending Sept. 30, 1915.

Month.	Discharge in second-feet.			Run-off (total in acre-feet).	Accuracy.
	Maximum.	Minimum.	Mean.		
May 8–31	180	41	81.2	3,870	B.
June	283	101	150	8,930	B.
July	108	19	47.2	2,900	B.
August	18	4.5	9.37	576	B.
September	6.0	3.5	4.50	268	B.
The period	283	3.5	57.1	18,500	

LAMOILLE CREEK NEAR HALLECK, NEV.

Location.—In NW. ¼ sec. 9, T. 35 N., R. 58 E., Elko County, half a mile below mouth of Secret Creek, the largest tributary, 1½ miles south of Halleck station on the Southern Pacific Railroad, and 2 miles above confluence with Humboldt River.

Drainage area.—245 square miles.

Records available.—May 12, 1913, to September 30, 1915.

Gage.—Vertical staff on left bank, 200 feet below ford; read once daily by Harry Gorman and Jack Rose. Datum lowered 1.00 foot August 19, 1915.

Discharge measurements.—Made from cable 200 feet above gage or by wading.

Channel and control.—Bed composed of gravel; control is gravel bar which shifts occasionally and at times is affected by beaver dams. Channel very crooked; banks overflow during floods.

Extremes of discharge.—Maximum stage recorded during year, 4.2 feet June 3, 11, 12, and 13 (discharge, 113 second-feet); minimum stage (creek dry in August and September).

1913–1915: Maximum stage recorded, 6.7 feet June 5, 1914 (discharge, 556 second-feet); minimum stage (creek dry in August and September, 1915).

Winter flow.—Stage-discharge relation seriously affected by ice; flow estimated from observer's notes, discharge measurements, and comparison with records of near-by stations.

Diversions.—Below all diversions except one small ditch.

Regulations.—Flow affected by irrigation diversions above.

Accuracy.—Records fair.

Discharge measurements of Lamoille Creek near Halleck, Nev., during the year ending Sept. 30, 1915.

Date.	Made by—	Gage height.	Discharge.	Date.	Made by—	Gage height.	Discharge.
		Feet.	*Sec-ft.*			*Feet.*	*Sec.-ft.*
Oct. 8	L. W. Jordan	3.28	25.5	Apr. 11	J. J. Sanford	3.28	29.4
Dec. 2	.....do	[a]3.22	19.8	May 5	A. B. Purton	3.11	17.3
Feb. 4	.....do	[b]5.10	20.9	June 25	.....do	3.35	34.2
Apr. 11	A. B. Purton	3.28	27.6				

[a] Complete ice cover; stage-discharge relation affected.
[b] Water flowing over ice; stage-discharge relation affected.

Daily discharge, in second-feet, of Lamoille Creek near Halleck, Nev., for the year ending Sept. 30, 1915.

Day.	Oct.	Nov.	Dec.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.
1	22	27	21	20	....	49	22	67	20	0.6
2	22	27	20	20	....	48	22	79	17	.4
3	22	27	....	20	....	46	21	113	14	.4
4	25	27	....	21	....	45	19	101	13	.3
5	25	27	....	....	46	41	18	83	12	.2
6	25	27	....	....	40	43	18	88	12	....
7	25	27	....	....	38	41	19	96	11	....
8	27	27	....	....	40	40	20	101	9.8	....
9	27	27	....	....	41	40	20	107	9.0	....
10	34	27	....	....	45	30	19	107	8.4	....
11	31	27	....	....	48	27	17	113	7.8	....
12	29	27	....	....	50	26	16	113	7.5	....
13	28	27	....	....	53	24	19	113	6.9	....
14	28	27	....	....	55	23	18	107	6.0	....
15	27	27	....	....	55	23	16	101	5.6	....
16	28	....	....	....	55	26	20	107	5.4	....
17	28	....	....	....	53	27	23	90	5.4	....
18	28	....	....	....	49	29	19	67	5.2	....
19	28	....	....	....	48	31	21	45	5.0	....
20	28	....	....	....	46	31	24	41	5.0	....
21	27	....	....	....	46	32	26	40	5.0	....
22	27	....	....	....	48	32	23	40	4.6	....
23	27	....	....	....	49	31	21	88	4.4	....
24	28	....	....	....	51	29	24	34	4.6	....
25	28	....	....	....	53	29	29	32	4.8	....
26	28	....	....	....	48	28	27	30	5.0	....
27	28	....	....	....	46	27	85	28	4.0	....
28	27	....	....	....	45	26	41	26	3.2	....
29	27	....	....	....	46	24	41	24	2.0	....
30	27	....	....	....	48	24	41	22	1.4	....
31	27	....	....	....	49	....	53	....	1.0	....

Note.—Discharge determined from a rating curve well defined between zero and 100 second-feet; July 1-3, interpolated; Aug. 6 to Sept. 30, creek dry. Discharge estimated, because of ice, Nov. 16-30, 24 second-feet; December, 15 second-feet; January, 18 second-feet; February, 25 second-feet; Mar. 1-4, 30 second-feet.

Monthly discharge of Lamoille Creek near Halleck, Nev., for the year ending Sept. 30, 1915.

Month.	Discharge in second-feet.			Run-off (total in acre-feet).	Accuracy.
	Maximum.	Minimum.	Mean.		
October	34	22	27.0	1,660	B.
November	27	....	25.5	1,520	C.
December	....	....	15.0	922	D.
January	....	....	18.0	1,110	D.
February	....	....	25.0	1,390	D.
March	55	....	45.5	2,800	B.
April	49	23	32.4	1,930	B.
May	53	16	24.3	1,490	B.
June	113	22	71.8	4,270	B.
July	20	1.0	7.29	448	B.
August	0.6	0	.06	4	
September	0	0	0	0	
The year	113	0	24.2	17,500	

NORTH FORK OF HUMBOLDT RIVER AT DEVILS GATE, NEAR HALLECK, NEV.

Location.—In sec. 13, T. 38 N., R. 57 E., Elko County, at the narrows about 3½ miles above the buildings of Morgan Hill ranch (also known as Devils Gate ranch), 17 miles north of Halleck and 27 miles by wagon road from Elko.

Drainage area.—830 square miles (measured on maps issued by General Land Office).

Records available.—November 11, 1913, to September 30, 1915; also at mouth of stream from October 10, 1902, to December 31, 1909, and October 1, 1910, to December 31, 1913.

Gage.—Stevens water-stage recorder on right bank at mouth of canyon; original gage was abouut 15 miles downstream; comparatively little run-off entering below the present station, except during storms.

Discharge measurements.—Made from cable about 30 feet below gage or by wading.

Channel and control.—Bed composed of sand with gravel riffle at control; about half of the control section is affected by the growth of moss. Channel is crooked and banks are comparatively high and covered with willows; at extreme high stages water may overflow right bank and pass in an overflow channel around gage. Gage height of zero flow, about 0.7 foot.

Extremes of discharge.—Maximum stage recorded during year, 3.44 feet at 3 a. m. March 26 (discharge, 194 second-feet); minimum stage, 1.03 feet at noon August 31 (discharge, 2.6 second-feet).

1913–1915: Maximum stage recorded, 7.23 feet April 7, 1914 (discharge, 722 second-feet); minimum discharge, 1 second-foot August 20–28 and September 30, 1913 (stage, 2.5 feet).

Winter flow.—Stage-discharge relation seriously affected by ice; flow estimated from discharge measurements, observer's notes, and climatic records. River freezes over at gage but riffle is sometimes partly open; anchor ice collects on riffle.

Diversions.—Numerous diversions in the valleys above and below Devils Gate. During the summer almost all low-waer flow is diverted.

Regulation.—Flow during summer depends on amount of irrigation above. A minimum flow is maintained from seepage and springs.

Accuracy.—Records fair.

Discharge measurements of North Fork of Humboldt River at Devils Gate, near Halleck, Nev., during the year ending Sept. 30, 1915.

Date.	Made by—	Gage height.	Discharge.	Date.	Made by—	Gage height.	Discharge.
		Feet.	*Sec.-ft.*			*Feet.*	*Sec.-ft.*
Dec. 3[a]	L. W. Jordan	1.49	22.6	May 10	A. B. Purton	1.89	47.8
Feb. 4[a]	.....do	1.50	20.2	June 22	.....do	1.46	22.2
Apr. 10	A. B. Purton	2.30	78	Aug. 18	.....do	1.06	3.3
10	J. J. Sanford	2.30	81	30	.....do	1.06	3.3

[a] Stage-discharge relation affected by ice.

Daily discharge, in second-feet, of North Fork of Humboldt River at Devils Gate, near Halleck, Nev., for the year ending Sept. 30, 1915.

Day.	Oct.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.
1	16	....	27	98	77	55	9.0	....	3.4
2	16	....	28	91	82	....	8.8	....	3.8
3	17	....	28	92	85	....	....	....	4.2
4	17	....	28	94	77	....	....	....	4.4
5	18	....	29	94	67	....	....	....	4.8
6	18	....	27	93	63	....	....	....	5.2
7	19	....	28	91	60	....	....	....	5.0
8	19	....	28	85	57	....	....	....	5.0
9	19	22	29	83	50	....	....	....	5.0
10	21	24	30	78	48	....	....	....	5.0
11	23	28	30	69	44	....	....	....	4.8
12	22	26	33	66	43	....	....	....	5.0
13	21	27	35	69	44	....	....	....	5.0
14	20	31	35	70	54	....	....	....	5.2
15	20	30	42	76	63	38	....	....	5.2
16	20	27	47	78	55	36	....	....	5.4
17	20	24	51	70	52	33	....	....	5.4
18	20	24	51	68	57	30	....	3.2	5.2
19	19	24	51	70	77	28	....	3.8	5.2
20	19	25	52	69	87	24	....	3.8	5.0
21	20	26	59	69	76	24	....	3.2	4.6
22	20	26	66	76	75	22	....	3.0	4.6
23	22	26	80	92	76	19	....	3.0	4.4
24	26	26	108	99	83	15	....	3.0	4.6
25	25	26	159	92	87	14	....	3.0	5.4
26	24	26	177	84	92	13	....	3.2	6.3
27	24	26	148	80	86	11	....	3.2	6.0
28	23	28	140	73	77	9.8	....	3.2	6.0
29	23	....	128	70	71	9.2	....	3.2	6.0
30	24	....	138	71	64	9.0	....	3.2	6.0
31	24	....	113	....	58	....	....	2.8	....

NOTE.—Discharge determined from two fairly well defined rating curves; one used Oct. 1–30 and Aug. 18 to Sept. 30, the other Feb. 9 to May 15. Indirect method for shifting control used May 16 to June 1 and June 15 to July 2. Discharge interpolated while recorder was not in operation; Oct. 1–7, and 31, as given in table; Nov. 1–30, 24 second-feet; June 2–14, 46 second-feet; July 3–31, 7.0 second-feet, and Aug. 1–17, 4.0 second-feet. Mean flow estimated on account of ice, Dec. 1–31, 19 second-feet; Jan. 1–31, 21 second-feet; Feb. 1–8, 20 second-feet; Feb. 13–16, as in table.

Monthly discharge of North Fork of Humboldt River at Devils Gate, near Halleck, Nev., for the year ending Sept. 30, 1915.

Month.	Discharge in second-feet.			Run-off (total in acre-feet).	Accuracy.
	Maximum.	Minimum.	Mean.		
October	26	16	20.6	1,270	B.
November			24.0	1,430	D.
December			19.0	1,170	D.
January			21.0	1,290	D.
February	31		24.4	1,360	B.
March	177	27	65.3	4,020	B.
April	99	66	80.3	4,780	B.
May	87	43	67.3	4,140	B.
June	55	9	32.9	1,960	C.
July	9		7.12	438	D.
August		2.8	3.64	224	C.
September	6.3	3.4	5.04	300	C.
The year	177	2.8	30.9	22,400	

SOUTH FORK OF HUMBOLDT RIVER NEAR ELKO, NEV.

Location.—In sec. 19, T. 33 N., R. 55 E., at head of canyon below Cowling's ranch, 4 miles above mouth and 10 miles southwest of Elko, Elko County.

Drainage area.—Not measured (1,150 square miles at old station 1½ miles above).

Records available.—August 29, 1896, to December 31, 1909; September 9, 1910, to September 30, 1915.

Gage.—Stevens water-stage recorder on right bank, 1½ miles below highway bridge November 14, 1913, to September 30, 1915; inclined staff on left bank one-fourth mile above bridge, February 26, 1907, to November 13, 1913; prior to February, 1907, several gages at slightly different sites and datums.

Discharge measurements.—Made from cable just below gage or by wading.

Channel and control.—Bed composed of gravel and sand. One channel at all stages. Rock riffle a short distance below gage affords permanent control.

Extremes of discharge.—Maximum stage recorded during year, 2.85 feet at 1.45 p. m. June 10 (discharge, 372 second-feet); minimum stage, dry in August and September).

1896–1915: Maximum stage recorded, 10.0 feet January 26, 1914 (discharge, 2.400 second-feet); minimum stage, dry in August and September, 1915.

Winter flow.—Stage-discharge relation seriously affected by ice; flow determined from discharge measurements, observer's notes, and climatic records.

Diversions.—Below all tributaries and all diversions except those of Hunter and Banks ranch 3 miles downstream.

Regulation.—Flow affected by diversions above.

Accuracy.—Records good.

Discharge measurements of South Fork of Humboldt River near Elko, Nev., during the year ending Sept. 30, 1915.

Date.	Made by—	Gage height.	Discharge.	Date.	Made by—	Gage height.	Discharge.
		Feet.	*Sec.-ft.*			*Feet.*	*Sec.-ft.*
Nov. 30[a]	L. W. Jordan	0.78	14	May 6	A. B. Purton	1.10	44.1
Feb. 6[a]	.....do	1.82	22.3	June 21	.....do	1.70	108
Apr. 9	Sanford and Purton	1.12	43.6	July 14	.....do	.76	16.1

[a] Stage discharge relation affected by ice.

Daily discharge, in second-feet, of South Fork of Humboldt River near Elko, Nev., for the year ending Sept. 30, 1915.

Day.	Oct.	Nov.	Mar.	Apr.	May.	June.	July.	Aug.
1	9.0	26	37	48	68	280	48	1.2
2	9.5	25	38	47	65	341	46	1.8
3	10	24	38	46	57	275	44	1.7
4	10	24	35	46	52	223	43	1.5
5	11	24	35	46	53	184	42	.9
6	12	22	31	46	44	174	40	.8
7	12	22	31	46	38	182	38	1.0
8	15	21	31	45	31	221	36	.8
9	18	21	32	44	30	273	34	.6
10	20	22	32	42	31	314	32	.5
11	18	23	33	43	31	281	29	....
12	18	22	34	43	33	217	25	....
13	17	20	36	45	38	174	20	....
14	18	20	35	51	49	140	16	....
15	18	22	36	51	55	122	15	....
16	18	20	37	50	54	111	15	....
17	19	20	38	51	82	110	12	....
18	20	21	35	44	126	108	9.5	....
19	20	18	34	46	156	104	7.4	....
20	20	14	32	47	163	104	6.0	....
21	22	7.1	31	50	145	105	4.8	....
22	24	8.9	31	50	152	98	3.3	....
23	26	9.5	33	49	142	116	3.5	....
24	25	10	35	47	128	105	4.2	....
25	25	11	37	48	120	94	3.3	....
26	26	11	38	47	112	84	2.6	....
27	25	12	38	46	105	73	2.6	....
28	24	13	38	42	105	68	2.0	....
29	24	13	42	46	129	56	1.6	....
30	24	14	45	57	152	51	1.5	....
31	24	....	46	....	182	....	1.3	....

NOTE.—Discharge determined from a well-defined rating curve. Daily flow interpolated Oct. 1–6, Nov. 23–29, July 2–4, 6–10, and 12–13. Mean flow estimated, because of ice, Dec. 1–31, 10 second-feet; Jan. 1–31, 12 second-feet; Feb. 1–28, 28 second-feet. Stream was dry August 11 to September 30.

Monthly discharge of South Fork of Humboldt River near Elko, Nev., for the year ending Sept. 30, 1915.

Month.	Discharge in second-feet.			Run-off (total in acre-feet).	Accuracy.
	Maximum.	Minimum.	Mean.		
October	26	9.0	18.7	1,150	B.
November	25	7.1	18.0	1,070	B.
December	....	....	10.0	615	D.
January	....	....	12.0	738	D.
February	....	....	28.0	1,560	D.
March	46	31	35.6	2,190	B.
April	57	42	47.0	2,800	B.
May	182	30	88.3	5,430	B.
June	341	51	160	9,520	B.
July	48	1.3	19.0	1,170	B
August	1.8	0	.35	21	
September	0	0	0	0	
The year	341	0	36.3	26,300	

MAGGIE CREEK AT CARLIN, NEV.

LOCATION.—In sec. 26, T. 33 N., R. 52 E., 500 feet above highway bridge, half a mile above mouth, and half a mile east of Carlin, Elko County.

DRAINAGE AREA.—Not measured.

RECORDS AVAILABLE.—June 6, 1913, to September 30, 1915.

GAGE.—Inclined staff on left bank about 600 feet above Pacific Fruit Express Co. dam, October 26, 1913, to September 30, 1915; vertical staff at the bridge 100 feet above dam June 6 to October 25, 1913; read twice a day by W. O. Blinn.

Monthly discharge of North Fork of Humboldt River at Devils Gate,
leck, Nev., for the year ending Sept. 30, 1915.

Month.	Discharge in second-feet.		
	Maximum.	Minimum.	Mean.
October	26	16	20.6
November			24.0
December			19.0
January			21.0
February	31		24.4
March	177	27	65.3
April	99	66	80.3
May	87	43	67.3
June	55	9	32.
July	9		7.
August		2.8	3.
September	6.3	3.4	5.
The year	177	2.8	3

SOUTH FORK OF HUMBOLDT RIVER NEAR ELK

Location.—In sec. 19, T. 33 N., R. 55 E., at head of can ranch, 4 miles above mouth and 10 miles southwest of

Drainage area.—Not measured (1,150 square miles at above).

Records available.—August 29, 1896, to December 31, to September 30, 1915.

Gage.—Stevens water-stage recorder on right bank, bridge November 14, 1913, to September 30, 1915; one-fourth mile above bridge, February 26, 190 prior to February, 1907, several gages at slightly

Discharge measurements.—Made from cable just

Channel and control.—Bed composed of gravel all stages. Rock riffle a short distance below trol.

Extremes of discharge.—Maximum stage record 1.45 p. m. June 10 (discharge, 372 second-f August and September).

1896–1915: Maximum stage recorded, 10 charge, 2.400 second-feet); minimum stag 1915.

Winter flow.—Stage-discharge relation serio mined from discharge measurements, obs

Diversions.—Below all tributaries and all and Banks ranch 3 miles downstream.

Regulation.—Flow affected by diversions

Accuracy.—Records good.

Discharge measure of South Fork
the year endin

Date.		
		Sec.-f
Nov.	1.78	14
Feb.	1.82	22
Apr	1.12	43

r the year ending Sept.

	D.
	B.
	B.
	B.
0	B.
94	B.
56	C.
3	D.
40	D.
4,030	

AIN, NEV.

tbridge about a
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35 miles north of
only large tributary
iles below in 1896.

d about every other day

r by wading.
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tages. Banks high and clean.
rded, 2.0 feet May 21 and 26
ge, 1.2 feet July 5 and 7 (dis-

ve station; there is a small reser-
uaw Valley.
and storage above.
incomplete gage-height record.

ek at Rock Creek ranch, near Battle
e year ending Sept. 30, 1915.

y A. B. Purton.]

Dis-harge.	Date.	Gage height.	Dis-charge.
Sec.-ft.		*Feet.*	*Sec.-ft.*
11.4	July 17	1.70	6.7
11.5	Aug. 29	1.55	3.4
6.8			

Discharge measurements.—Made from highway bridge or by wading.

Channel and control.—Bed composed of sand and gravel; shifts occasionally. One channel at all stages.

Extremes of discharge.—Maximum stage recorded during year, 2.1 feet at 8 a. m. March 29 and 31 (discharge, 29 second-feet); minimum stage, 0.95 foot August and September (discharge, 0.1 second-foot).

1913–1915: Maximum stage recorded, 4.5 feet April 28, 1914 (discharge, 394 second-feet); minimum stage, 0.95 foot August and September, 1915 (discharge, 0.1 second-foot).

Regulation.—Flow affected by irrigation diversions above.

Accuracy.—Records fair.

Discharge measurements of Maggie Creek at Carlin, Nev., during the year ending Sept. 30, 1915.

Date.	Made by—	Gage height.	Discharge.	Date.	Made by—	Gage height.	Discharge.
		Feet.	*Sec.-ft.*			*Feet.*	*Sec.-ft.*
Oct. 11	L. W. Jordan	1.63	5.9	Apr. 9	A. B. Purton	1.95	22.3
Dec. 1[a]	do	2.84	5.2	June 26	do	1.10	1.4
Feb. 7	do	1.31	3.2	Sept. 11	do	.98	[b].05

[a] Complete ice cover at the gage; stage-discharge relation affected.
[b] Discharge estimated.

Daily discharge, in second-feet, of Maggie Creek at Carlin, Nev., for the year ending Sept. 30, 1915.

Day.	Oct.	Nov.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.
1	5.1	6.8		2.2	11	24	6.1	6.1	1.4	0.1	
2	5.1	6.8		2.4	13	24	6.1	6.1	1.3	.1	
3	5.1	6.8		3.1	16	24	4.7	6.1	1.3		
4	5.1	6.8		3.1	14	24	4.3	6.1	1.3		
5	5.1	6.8		3.7	13	24	3.7	6.1	1.3		
6	5.1	6.8		3.6	12	24	3.1	5.2	1.0		
7	5.1	6.8		3.5	12	24	2.9	5.2	1.0		
8	5.1	6.8		4.3	8.2	24	2.6	5.2	1.0		
9	5.1	6.8		5.7	9.5	23	1.8	4.3	1.0		
10	5.1	6.8		8.2	12	24	1.3	4.1	1.0		
11	6.5	7.8		8.8	8.8	22	1.2	3.7	1.0		
12	6.8	7.8		8.2	13	22	1.1	3.7	1.0		
13	6.8	7.8		12	12	22	1.4	3.1	1.0		
14	6.8	6.8		11	11	22	1.6	3.1	1.0		
15	6.8	6.8		11	12	20	1.8	2.6	1.0		
16	6.8	6.8		9.5	13	16	2.0	2.6	1.0		
17	6.8	6.8		12	16	13	3.6	2.4	1.0		0.1
18	5.1	6.8		11	16	12	4.7	2.4	1.0		.2
19	5.1	6.8		11	12	11	5.7	2.2	.9		.1
20	5.8	6.8		12	12	9.5	5.7	2.2	.8		.2
21	6.8			11	16	7.5	5.9	1.8	.8		1.0
22	8.5			9.5	16	6.1	6.1	1.8	.7		1.0
23	10			8.8	16	6.1	6.1	1.8	1.0		1.4
24	10		1.6	8.8	16	8.8	6.7	1.4	.9		1.0
25	10		1.8	12	20	8.8	7.5	1.4	.8		2.2
26	8.5		2.0	11	21	8.8	7.5	1.4	.8		2.6
27	8.5		2.2	12	22	7.5	7.5	1.4	.7		2.6
28	8.5		2.2	16	24	7.5	7.5	1.4	.6		2.2
29	6.8		2.2		27	6.1	7.5	1.4	.4		2.2
30	6.8		2.2		25	6.1	7.5	1.4	.3		2.6
31	6.8		2.2		27		6.1		.1		2.6

Note.—Discharge determined from three fairly well defined rating curves applicable Oct. 1 to Nov. 20, Jan. 24 to July 17, and Aug. 1 to Sept. 30. Mean flow estimated on account of uncertainties in gage height record and possible ice effect as follows: Nov. 21–30, 6 second-feet; Dec. 1–31, 3 second-feet; and Jan. 1–23, 1.5 second-feet. Indirect method for shifting control used July 18–31. Mean flow estimated 0.05 second-foot Aug. 3 to Sept. 16, based on measurement of Sept. 11.

Monthly discharge of Maggie Creek at Carlin, Nev., for the year ending Sept. 30, 1915.

Month.	Discharge in second-feet.			Run-off (total in acre-feet).	Accuracy.
	Maximum.	Minimum.	Mean.		
October	10	5.1	6.63	408	B.
November	7.8	....	6.63	395	B.
December	....	....	3.00	184	D.
January	2.2	....	1.64	101	D.
February	16	2.2	8.41	467	B.
March	27	8.2	15.4	947	B.
April	24	6.1	16.1	958	B.
May	7.5	1.1	4.56	280	B.
June	6.1	1.4	3.26	194	B.
July	1.4	.1	.91	56	C.
August	.1	....	.05	3	D.
September	2.6	....	.67	40	D.
The year	27	....	5.57	4,030	

ROCK CREEK AT ROCK CREEK RANCH, NEAR BATTLE MOUNTAIN, NEV.

LOCATION.—Probably in sec. 6, T. 37 N., R. 47 E., at an old footbridge about a mile above diversion dam at mouth of canyon, and 1½ miles above the Rock Creek ranch house, a few miles south of Dutton, and 35 miles north of Battle Mountain, Lander County. Willow Creek is the only large tributary between this station and the one maintained several miles below in 1896.

DRAINAGE AREA.—Not measured.

RECORDS AVAILABLE.—May 13 to September 30, 1915.

GAGE.—Vertical staff near left end of footbridge; read about every other day by W. H. Muffley.

DISCHARGE MEASUREMENTS.—Made from footbridge or by wading.

CHANNEL AND CONTROL.—Bed composed of rocks and gravel, but likely to shift at extreme high stages. One channel at all stages. Banks high and clean.

EXTREMES OF DISCHARGE.—Maximum stage recorded, 2.0 feet May 21 and 26 (discharge, 17 second-feet); minimum stage, 1.2 feet July 5 and 7 (discharge, 0.4 second-foot).

DIVERSIONS.—Numerous small diversions above station; there is a small reservoir on one of the tributaries above Squaw Valley.

REGULATION.—Flow affected by diversions and storage above.

ACCURACY.—Records only fair owing to incomplete gage-height record.

Discharge measurements of Rock Creek at Rock Creek ranch, near Battle Mountain, Nev., during the year ending Sept. 30, 1915.

[Made by A. B. Purton.]

Date.	Gage height.	Discharge.	Date.	Gage height.	Discharge.
	Feet.	*Sec.-ft.*		*Feet.*	*Sec.-ft.*
May 13	1.86	11.4	July 17	1.70	6.7
13	1.87	11.5	Aug. 29	1.55	3.4
July 17	1.70	6.8			

Daily discharge, in second-feet, of Rock Creek at Rock Creek ranch, near Battle Mountain, Nev., for the year ending Sept. 30, 1915.

Day.	May.	June.	July.	Aug.	Sept.	Day	May.	June.	July.	Aug.	Sept.
1		15	1.5	4.4	3.6	16	8.8	13			5.6
2		15	1.5	4.7	3.6	17	8.1	12	6.7		
3		15	1.5	5.0	3.6	18	10	12			
4		14	1.0	5.3	3.6	19	13	11			
5		13	.4	5.6	3.6	20	15	7.0			
6		13	.4	5.8	4.0	21	17	2.7			
7		13	.4	6.0	4.2	22	15	3.6			
8		13		6.2	4.4	23	13	4.4			
9		12		6.4	4.4	24	14	4.4			
10		11		6.7	4.4	25	16	4.4	4.4		
11		12		6.7	4.4	26	17	3.6	4.4		
12		13		6.7	4.4	27	16	3.3	4.4		
13	12	13		6.7	4.4	28	15	3.0	4.4		
14	11	13			4.8	29	14	2.7	4.4	3.6	
15	9.5	13			5.2	30	12	2.1	4.4	3.6	
						31	11		4.4	3.6	

NOTE.—Discharge determined from a fairly well defined rating curve. Mean flow estimated July 8–16, 3.5 second-feet and Sept. 17–24, 5.0 second-feet. Mean flow interpolated July 18–24, 5.6 second-feet, and Aug. 14–28, 5.2 second-feet. Daily discharge interpolated on days when gage was not read, except as noted above.

Monthly discharge of Rock Creek at Rock Creek ranch, near Battle Mountain, for the year ending Sept. 30, 1915.

Month.	Discharge in second-feet.			Run-off (total in acre-feet).	Accuracy.
	Maximum.	Minimum.	Mean.		
May 13–31	17	8.1	13.0	491	C.
June	15	2.1	9.57	569	D.
July	6.7	.4	3.71	228	C.
August	6.7	3.6	5.32	327	C.
September	5.6	3.6	4.61	274	C.
The period	17	.4	6.75	1,890	

REESE RIVER NEAR BERLIN, NEV.

LOCATION.—In the SW. ¼ sec. 16, T. 12 N., R. 40 E., close to boundary of Toiyabe National Forest, just above the mouth of Illinois Creek, 1½ miles below Archie Bell's ranch, 2 miles above the Bell home ranch, 7 miles east of Berlin, Nye County, and 55 miles south of Austin.

DRAINAGE AREA.—94 square miles (measured on topographic maps).

RECORDS AVAILABLE.—June 10, 1913, to November 10, 1914; March 1 to September 30, 1915.

GAGE.—Vertical staff on left bank 300 feet above head gate of the upper Bell canal; gage 10 feet downstream with datum 1.17 higher read June 29 to September 30, 1915; an auxiliary gage, about 1½ miles below the regular gage, used November 1, 1913, to April 28, 1914, October 20 to November 10, 1914, and March 1 to April 18, 1915, when no water was being diverted between gages.

DISCHARGE MEASUREMENTS.—Made by wading.

CHANNEL AND CONTROL.—Stream very crooked. Banks low, covered with a thick growth of willows; subject to overflow at high stages; control at low stages is a fairly well defined gravel riffle a few feet below gage.

EXTREMES OF DISCHARGE.—Maximum stage recorded during year, 3.9 feet, new datum, June 2, 3, and 4 (discharge, 128 second-feet); minimum stage, 0.90 foot at 4 p. m. September 11 (discharge, 1.5 second-feet).

1913–1915: Maximum stage recorded, 5.5 feet, old datum, September 2, 1913 (discharge, 173 second-feet); minimum stage, 0.90 foot September 11, 1915 (discharge, 1.5 second-feet).

Winter flow.—Station was discontinued during winter. Flow probably did not average more than 5 or 6 second-feet.

Diversions.—A small amount of water is diverted at the Archie Bell ranch above the station.

Regulation.—None.

Accuracy.—Discharge measurement made this year show a reversal in the rating curve between 1.8 feet and 3.5 feet gage height, and the position of the rating curve is not well enough defined to permit the publication of daily discharge. The maximum and minimum are not affected by the reversal, and are approximately correct as published. Records of flow as published in Water-Supply Papers 360 and 390 should be used with caution.

Discharge measurements of Reese River near Berlin, Nev., during the year ending Sept. 30, 1915.

[Made by A. B. Purton.]

Date.	Gage height.	Discharge.	Date.	Gage height.	Discharge.
	Feet.	*Sec.-ft.*		*Feet.*	*Sec.-ft.*
Apr. 17	[a] 2.83	62	June 28	[c] 3.22	28.6
17	[b] 2.80	64	29	1.84	37.9
June 28	1.86	37.4	Sept. 10	.91	1.9
28	1.86	36.2			

[a] Measurements are referred to datum established June 29.
[b] Auxiliary gage read 4.30, 1 hour later, with no diversions between gages.
[c] Measurement at auxiliary gage; water being diverted between gages.

Daily gage height, in feet, of Reese River near Berlin, Nev., for the year ending Sept., 30, 1915.

Day.	Oct.	Nov.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.
1	1.1	2.3	2.3	3.2	3.0	3.8	1.80	1.44	
2	1.1	2.3	2.3	3.2	2.8	3.9	1.80	1.44	
3	1.1	2.3	2.35	3.2	2.8	3.9	1.80	1.42	
4	1.1	2.3	2.35	3.25	2.8	3.9	1.82	1.42	
5	1.1	2.3	2.35	3.3	2.9	3.8	1.82	1.38	
6	1.1	2.3	2.3	3.35	3.0	3.6	1.80	1.38	
7	1.1	2.3	2.3	3.4	3.05	3.35	1.80	1.36	
8	1.1	2.3	2.3	3.4	3.05	3.0	1.78		
9	1.1	2.3	2.3	3.4	3.1	3.0	1.74		
10	1.1	2.3	2.3	3.4	3.0	3.0	1.66		0.91
11	1.1		2.3	3.4	3.1	2.96	1.62		.90
12	1.1		2.3	3.4	3.1	2.95	1.54		.94
13	1.05		2.3	3.5	3.0	2.95	1.54		.94
14	1.0		2.5	3.6	3.1	2.8	1.52		.94
15	1.1		2.5	3.65	3.1	2.8	1.52		.95
16	1.1		2.55	3.7	3.2	2.75	1.52		.96
17	1.1		2.55	4.15	3.25	2.7	1.50		.96
18	1.1		2.6	4.1	3.1	2.65	1.50		.94
19	1.1		2.55	2.9	3.1	2.6	1.50		.94
20	2.3		2.56	2.9	3.0	2.5	1.54		.96
21	2.3		2.55	2.8	2.9	2.4	1.56		.96
22	2.2		2.6	2.8	2.8	2.35	1.56		.95
23	2.2		2.6	2.8	2.9	2.3	1.54		.96
24	2.25		2.6	2.9	3.0	2.15	1.54		.96
25	2.3		2.6	2.9	3.2	2.1	1.52		98
26	2.3		2.6	2.8	3.2	2.1	1.50		.98
27	2.3		2.6	2.9	3.2	2.1	1.50		.98
28	2.4		3.1	2.8	3.2	1.9	1.48		.98
29	2.3		3.1	3.0	3.4	1.84	1.46		.98
30	2.3		3.2	2.9	3.6	1.82	1.46		.98
31	2.3		3.25		3.65		1.44		

Note.—Upper gage read Oct. 1-19, Apr. 19 to Aug. 7, and Sept. 10–30; auxiliary gage read Oct. 20 to Nov. 10 and Mar. 1 to Apr. 18. No gage readings available Nov. 11 to Feb. 28 and Aug. 7 to Sept. 9.

HUMBOLDT-LOVELOCKS IRRIGATION, LIGHT & POWER CO.'S CANAL NEAR MILL CITY, NEV.

Location.—In the SW. ¼ sec. 29, T. 33 N., R. 35 E., one-fourth mile below head of canal, about 2½ miles northwest of Mill City, Humboldt County.

Records available.—February 19, 1914, to May 16, 1915.

Gage.—Stevens water-stage recorder on left bank.

Discharge measurements.—Made from footbridge at gage or by wading.

Channel and control.—Earth section. Control indefinite; stage-discharge relation affected by growth of aquatic plants and by the wash from several small gullies below the station.

Extremes of discharge.—Maximum stage recorded during year, 3.65 feet January 15. Canal dry during the summer.

1914–1915: Maximum stage recorded, 4.09 feet July 2 and 3, 1914 (discharge, 129 second-feet).

Winter flow.—Stage discharge relation affected by ice.

Diversions.—None.

Regulation.—Flow regulated at the head gates one-fourth mile above station.

Data inadequate for determination of daily discharge.

Canal diverts from Humboldt River in sec. 29, T. 33 N., R. 35 E., for storage in the Taylor-Pitt reservoirs near Humboldt. The water is returned to the river during the irrigation season, about 3 miles west of Humboldt through the Humboldt-Lovelocks Irrigation, Light & Power Co. outlet canal and carried in the natural channel to the head gates of the canals serving the Lovelocks district.

Discharge measurements of Humboldt-Lovelocks Irrigation, Light & Power Co.'s canal near Mill City, Nev., for the period Oct. 1, 1914, to May 16, 1915.

Date.	Made by—	Gage height.	Discharge.
		Feet.	*Sec.-ft.*
Oct. 5	L. W. Jordan	2.11	46.8
May 16	A. B. Purton	.54	[a].2

[a] Discharge estimated.

Daily gage height, in feet, of Humbolt-Lovelocks Irrigation, Light & Power Co.'s canal near Mill City, Nev., for the period Oct. 1, 1914, to May 16, 1915.

Day.	Oct.	Nov.	Dec.	Jan.	Feb.	May.	Day.	Oct.	Nov.	Dec.	Jan.	Feb.	May.
1		2.49	2.90				16	2.11	2.65				0.54
2	2.00	2.48	2.85				17	2.12	2.65				
3		2.34	3.20				18	2.13	2.65				
4		2.50	3.20				19	2.13	2.65				
5	2.10	2.65	3.05				20	2.14	2.70				
6	2.10	2.63				0.54	21	2.10	2.75				
7	2.10	2.63					22	2.12	2.64				
8	2.12	2.63					23	1.97	2.69				
9	2.18	2.65			3.22		24	2.04	2.79	2.20			
10	2.13	2.65					25	1.99	3.00				
11	2.09	2.65					26	2.15	3.03		3.62		
12	2.09	2.65					27	2.50	3.02				
13	2.12	2.65					28	2.69	3.02				
14	2.12	2.65					29	2.68	3.03				
15	2.12	2.65		3.65			30	2.62	2.90				
							31	2.58					

Note.—Water-stage recorder not in operation after Dec. 5. Head gates reported closed about Mar. 20, and canal was practically dry for the rest of the season.

HUMBOLDT-LOVELOCKS IRRIGATION, LIGHT & POWER CO.'S CANAL NEAR HUMBOLDT, NEV.

Location.—In the SE. ¼ sec. 30, T. 32 N., R. 33 E., at the outlet of the lower Taylor-Pitt reservoir, about 2½ miles west of Humboldt, Humboldt County.

Records available.—February 15, 1914, to September 30, 1915.

Gage.—Stevens water-stage recorder on right bank about 100 feet above weirs.

Discharge measurements.—Made from a footbridge ¼ mile below gage or by wading.

Channel and control.—Two 8-foot Cippoletti weirs form a permanent control. There is no flow at zero gage height.

Extremes of discharge.—1914–15: Maximum stage recorded during year, 3.02 feet at noon April 30 (discharge, 296 second-feet); minimum stage, canal dry during August and September.

Winter flow.—Gates usually closed during winter.

Diversions.—None.

Regulation.—Flow regulated at the outlet gates a few hundred feet above station.

Accuracy.—Records good.

Discharge measurements of Humboldt-Lovelocks Irrigation, Light & Power Co.'s canal near Humboldt, Nev., during the year ending Sept. 30, 1915

Date	Made by—	Gage height	Discharge.	Date	Made by—	Gage height.	Discharge.
		Feet.	*Sec.-ft.*			*Feet.*	*Sec.-ft.*
May 21	A. B. Purton	1.17	67	June 28	L. W. Jordan	1.28	75
21	.....do	1.17	68	28	.....do	1.54	106
June 28	L. W. Jordan	1.28	77	July 16	A. B. Purton	.30	9.4

Daily discharge, in second-feet, of Humboldt-Lovelocks Irrigation, Light & Power Co.'s canal near Humboldt, Nev., for the year ending Sept. 30, 1915.

Day.	Oct.	Nov.	Feb.	Mar.	Apr.	May.	June.	July.
1	0.5	12		14		210	108	102
2	.5	7.5		53		162	106	99
3	.5	.5		26		154	106	98
4	.5			15		117	106	100
5	.5					84	106	119
6	.5					63	106	119
7	.5					45	106	104
8	.5					47	116	107
9	.5					50	137	108
10	.5					50	136	100
11	.5		11		45	50	134	80
12	.5		32		125	51	136	66
13	.5		39		120	51	136	21
14	.5		46		134	51	134	18
15	.5		33		140	52	136	15
16	.5		20		170	66	133	13
17	.5				165	68	128	12
18	.5				165	66	110	9.5
19	.5				165	66	67	5.0
20	.5				173	66	59	3.7
21	.5				207	67	71	1.3
22	.5				207	67	68	.5
23	.5				207	67	69	.4
24	.5				207	67	71	.4
25	7.5				207	67	71	.3
26	12				206	74	69	.2
27	12				206	90	72	.2
28	12				220	90	83	.1
29	12				223	86	80	.1
30	12				259	87	88	
31	12					90		

Note.—Discharge determined from a well-defined rating curve. Mean flow estimated at 0.5 second-foot Nov. 4 to Feb. 10, Feb. 17-28, Mar. 5 to Apr. 10. Canal dry July 30 to Sept. 30.

Monthly discharge of Humboldt-Lovelocks Irrigation, Light & Power Co.'s canal near Humboldt, Nev., for the year ending Sept. 30, 1915.

Month.	Discharge in second-feet.			Run-off (total in acre-feet).	Accuracy.
	Maximum.	Minimum.	Mean.		
October	12	0.5	2.95	181	C.
November	12		1.12	67	D.
December			[a] .50	31	D.
January			[a] .50	31	D.
February	46		6.86	381	C.
March	53		3.92	241	C.
April	259		119	7,080	A.
May	210	45	78.1	4,800	A.
June	137	59	101	6,010	A.
July	119	0	42.0	2,580	A.
August	0	0	0	0	
September	0	0	0	0	
The year	259	0	29.6	21,400	

[a] Estimated.

PYRAMID AND WINNEMUCCA LAKES BASINS.

LAKE TAHOE AT TAHOE, CAL.

Location.—In the SE. ¼ sec. 6, T. 15 N., R. 17 E., near outlet of lake at Tahoe, Placer County.

Drainage area.—519 square miles (including water surface of lake, 193 square miles).

Records available.—1900 to September 30, 1915.

Gage.—Vertical staff fastened to piling of boat landing near outlet; read once a day by an employee of the United States Reclamation Service. Datum is 6,220 feet above sea level. Mean low-water elevation of lake is 6,226.0 feet.

Extremes of stage.—Maximum stage recorded during year, 9.14 feet July 9; minimum stage, 6.89 feet January 9.

1900–1915: Maximum stage recorded, 11.26 feet July 14, 15, 17, and 18, 1907; minimum stage, 4.68 feet December 19–21, 1913.

Accuracy.—Gage not read when water surface is rough.

Cooperation.—Record furnished by United States Reclamation Service.

Daily gage height, in feet, of Lake Tahoe at Tahoe, Cal., for the year ending Sept. 30, 1915.

Day.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.
1		7.93	7.50	7.07		7.60	7.60		8.59	9.09		8.49
2		7.91	7.50	7.05		7.60	7.58		8.62	9.10	8.91	8.47
3		7.89			7.30					9.11	8.90	8.45
4	8.32	7.89		7.05	7.33	7.59	7.60	8.06		9.11	8.89	8.42
5	8.28			7.05	7.33	7.58	7.63	8.07	8.70	9.10	8.88	8.41
6	8.21				7.32	7.58	7.66	8.08	8.74	9.11	8.87	8.39
7	8.21		7.45				7.68	8.10	8.78	9.12	8.85	8.36
8				7.00		7.58	7.68	8.10	8.82	9.11	8.84	8.34
9		7.85	7.40	6.89		7.60	7.69			9.14	8.83	8.33
10	8.19	7.83			7.45	7.58	7.68		8.85	9.13	8.80	8.31
11	8.19	7.83			7.48	7.58	7.68		8.88	9.13	8.79	8.26
12	8.16	7.82			7.48		7.69			9.12	8.77	8.18
13	8.15		7.35	6.91	7.47			8.35	8.90		8.75	8.15
14	8.13		7.35		7.49	7.56		8.38	8.92	9.11	8.72	8.13
15	8.13				7.50	7.56		8.40		9.11	8.71	8.12
16		7.80		7.10		7.57	7.74	8.41		9.10	8.70	8.10
17						7.56	7.75	8.41	9.00	9.10	8.69	8.08
18					7.60	7.56	7.75			9.10	8.68	8.07
19		7.75	7.30	7.08	7.65		7.78	8.42		9.08	8.66	8.06
20		7.73		7.02		7.50		8.45	9.00	9.09	8.64	8.00
21	8.02	7.70		7.00	7.65	7.50		8.47	9.01	9.08	8.64	7.99
22		7.68				7.50		8.48	9.00	9.08	8.62	7.99
23		7.65			7.65	7.50			9.02	9.08	8.60	7.97
24		7.62	7.20	6.95	7.63	7.50				9.07	8.59	7.95
25	8.00	7.60	7.15	6.94	7.60	7.50	7.88	8.50	9.02	9.07	8.58	7.91
26	7.98	7.58			7.59			8.50	9.02	9.05	8.56	7.89
27	7.97	7.55	7.14	7.00				8.51	9.04		8.55	7.86
28	7.96		7.13	7.02				8.51	9.04	9.01	8.54	7.84
29	7.96		7.12				7.92	8.51	9.07	8.99	8.53	7.83
30	7.96		7.10			7.48	7.95	8.53	9.08	8.98	8.52	7.82
31	7.96		7.10					8.56		8.95	8.51	

NOTE.—Gage heights not recorded when lake was too rough for accurate reading.

TRUCKEE RIVER AT TAHOE, CAL.

LOCATION.—In the NW. ¼ sec. 7, T. 15 N., R. 17 E., at Tahoe, Placer County, a short distance below dam at outlet of Lake Tahoe.

DRAINAGE AREA.—519 square miles.

RECORDS AVAILABLE.—July 3, 1895, to February 29, 1896; June 17, 1900, to September 30, 1915.

GAGE.—Vertical staff fastened to a large cottonwood tree on left bank, 300 feet below dam at outlet of Lake Tahoe. Original gage, 100 feet above, was destroyed by dredging operations July 15, 1912.

DISCHARGE MEASUREMENTS.—Made from cable 140 feet below gage or by wading.

CHANNEL AND CONTROL.—Bed composed of gravel; practically permanent.

EXTREMES OF DISCHARGE.—Maximum mean daily discharge for year, 652 second-feet November 24; minimum mean daily discharge, 5 second-feet May 2 to June 24.

1895–96 and 1900–1915: Maximum mean daily discharge, 1,340 second-feet July 13–20, 1907 (stage, 4.3 feet); minimum, river dry during parts of 1900, 1901, and 1914.

WINTER FLOW.—Stage-discharge relation not seriously affected by ice.

DIVERSIONS.—Above are diversions.

REGULATIONS.—Flow regulated by operation of gates in dam at Lake Tahoe.

COOPERATION.—Complete record furnished by United States Reclamation Service, which maintains the station in cooperation with Stone & Webster Engineering Corporation.

Discharge measurements of Truckee River at Tahoe, Cal., during the year ending Sept. 30, 1915.

[Made by Stone & Webster Engineering Corporation and U. S. Reclamation Service.]

Date.	Gage height.	Discharge.	Date.	Gage height.	Discharge.
	Feet.	*Sec.-ft.*		*Feet.*	*Sec.-ft.*
Oct. 2	3.20	384	July 15	2.02	105
2	4.25	701	Aug. 30	3.44	436

Daily discharge, in second-feet, of Truckee River at Tahoe, Cal., for the year ending Sept. 30, 1915.

Day.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.
1	488	618	457	552	216	261	10	6	5	22	402	402
2	367	618	457	552	249	261	10	6	5	22	402	402
3	367	618	457	552	249	261	10	6	5	22	426	402
4	367	618	457	552	249	261	10	6	5	22	426	399
5	367	618	457	552	227	261	10	6	5	22	426	396
6	367	367	457	552	205	273	10	6	5	22	426	396
7	367	367	457	426	205	273	7	5	5	22	426	367
8	367	367	457	339	205	273	7	5	5	22	457	367
9	367	367	457	339	185	273	7	5	5	22	457	367
10	367	457	457	339	205	286	7	5	5	98	457	367
11	367	457	457	339	205	286	7	5	5	98	457	367
12	367	457	457	339	205	312	7	5	5	141	457	339
13	367	457	457	339	205	312	7	5	5	96	457	339
14	339	457	552	261	205	273	7	5	5	96	457	339
15	339	457	552	261	205	273	7	5	5	98	457	339
16	339	457	552	339	185	273	7	5	5	163	457	336
17	339	457	552	339	185	174	7	5	5	163	426	353
18	339	552	552	312	185	174	7	5	5	141	426	353
19	339	552	552	273	164	174	7	5	5	141	426	353
20	339	552	552	249	164	174	7	5	5	212	423	353
21	339	552	552	299	195	·174	7	5	5	498	423	353
22	339	552	552	299	195	174	7	5	5	315	423	353
23	339	552	552	339	195	174	7	5	5	315	423	353
24	299	652	552	273	164	84	7	5	22	315	448	353
25	367	457	552	273	164	84	7	5	22	372	448	367
26	426	457	552	249	164	84	7	5	22	378	448	367
27	520	457	552	249	164	84	7	5	22	378	448	367
28	520	457	552	249	261	92	6	5	22	378	448	367
29	520	457	552	249	....	92	6	5	22	378	445	367
30	585	457	552	216	....	92	6	5	22	402	438	312
31	618	....	552	216	....	10	....	5	....	402	438	....

Monthly discharge of Truckee River at Tahoe, Cal., for the year ending Sept. 30, 1915.

Month.	Discharge in second-feet.			Run-off (total in acre-feet).
	Maximum.	Minimum.	Mean.	
October	618	299	392	24,100
November	652	367	497	29,600
December	552	457	512	31,500
January	552	216	346	21,300
February	261	164	200	11,100
March	312	10	202	12,400
April	10	6	7.5	446
May	6	5	5.2	320
June	22	5	9.0	536
July	498	22	186	11,400
August	457	402	438	26,900
September	402	312	363	21,600
The year	652	5	264	191,000

NOTE.—Monthly discharge computed by U. S. Geological Survey.

TRUCKEE RIVER AT ICELAND, CAL.

LOCATION.—In sec. 36, T. 18 N., R. 17 E., above dam of ice company, 400 feet northeast of Southern Pacific Railroad station at Iceland, Nevada County, and about 23 miles west of Reno, Nev.

DRAINAGE AREA.—Not measured.

RECORDS AVAILABLE.—August 1, 1912, to September 30, 1915. Records were obtained at a station about 3 miles downstream at the State line from September 7, 1899, to August 31, 1912.

GAGE.—Barrett & Lawrence water-stage recorder on right bank above dam; auxiliary vertical staff is fastened to gage well.

DISCHARGE MEASUREMENTS.—Made from cable 130 feet above gage.

CHANNEL AND CONTROL.—Bed composed of small boulders; fairly smooth and permanent. Left bank high; right bank subject to overflow at high stages. Dam of National Ice Co. serves as permanent control.

EXTREMES OF DISCHARGE.—Maximum mean daily discharge for year, 4,470 second-feet May 12; minimum mean daily discharge, 373 second-feet February 26.

1907–1915: Maximum mean daily discharge reported, 15,300 second-feet March 18, 1907 (stage, 11.5 feet); minimum mean daily discharge reported, 310 second-feet December 10, 1908 (stage, 7.9 feet).

WINTER FLOW.—Stage-discharge relation probably affected by ice.

DIVERSIONS.—The Union Ice Co. diverts water above gage; the diversion of the National Ice Co. below gage is equivalent to the same amount of diversion above, since the gage indicates only the water flowing over the dam.

REGULATION.—See Truckee River at Tahoe.

COOPERATION.—Records furnished by United States Reclamation Service, which maintains the station in cooperation with Stone & Webster Engineering Corporation.

Discharge measurements of Truckee River at Iceland, Cal., during the year year ending Sept. 30, 1915.

Date.	Made by—	Gage height.	Discharge.	Date.	Made by—	Gage height.	Discharge.
		Feet.	*Sec.-ft.*			*Feet.*	*Sec.-ft.*
Mar. 28	H. J. Tompkins	2.20	920	July 17	R. E. Hartley	1.64	493
June 2	R. E. Hartley	3.39	2,280	Sept. 1	.....do	1.74	557

Daily discharge, in second-feet, of Truckee River at Iceland, Cal., for the year ending Sept. 30, 1915.

Day.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.
1	526	706	580	625	425	461	756	1,550	2,270	898	590	520
2	476	706	580	660	534	501	890	1,370	2,390	898	583	520
3	476	706	526	660	455	468	1,590	1,090	2,100	875	583	590
4	476	706	526	660	425	475	1,560	1,040	1,780	833	590	555
5	476	706	580	660	481	475	1,320	1,050	1,780	756	604	520
6	429	526	580	697	455	475	976	1,050	1,820	683	590	520
7	429	429	580	735	415	475	1,010	1,070	1,880	604	590	488
8	476	476	526	520	401	481	1,110	1,230	2,240	534	604	488
9	476	476	526	488	395	487	1,100	1,370	2,340	488	590	488
10	476	526	526	488	408	475	1,310	2,890	2,000	590	597	488
11	476	526	526	488	415	501	1,390	4,070	1,900	611	590	590
12	476	526	526	488	415	512	1,910	4,470	1,560	611	590	468
13	476	526	526	488	408	520	2,130	2,030	1,400	611	590	480
14	476	526	526	455	415	604	1,470	3,900	1,320	555	590	488
15	476	526	610	395	408	555	1,520	2,890	1,270	455	590	488
16	476	526	610	488	425	597	1,920	2,340	1,270	431	590	455
17	429	526	610	488	440	541	2,060	2,270	1,350	475	555	455
18	476	526	610	500	401	562	2,300	2,240	1,290	488	548	468
19	476	580	610	425	395	583	2,690	2,280	1,220	443	541	468
20	476	580	610	401	390	583	1,460	1,720	1,050	462	541	468
21	526	580	610	390	390	604	2,500	1,400	1,060	625	541	455
22	476	640	610	385	390	604	2,110	1,370	1,100	660	541	455
23	476	640	610	419	415	639	2,000	1,370	1,100	646	548	455
24	476	706	610	437	408	749	1,720	1,390	1,040	618	569	488
25	526	580	610	401	395	819	1,520	1,330	993	625	569	507
26	526	526	610	385	373	840	1,420	1,300	875	618	569	470
27	580	526	610	390	380	784	1,430	1,550	861	611	562	470
28	580	526	610	401	385	875	1,750	1,880	875	590	562	470
29	640	526	610	385	....	927	1,760	2,040	911	576	562	470
30	640	526	610	390	....	756	1,820	1,850	897	576	562	470
31	706	....	610	395	....	668	....	1,920	....	576	555	....

Monthly discharge of Truckee River at Iceland, Cal., for the year ending Sept. 30, 1915.

Month.	Discharge in second-feet.			Run-off (total in acre-feet).
	Maximum.	Minimum.	Mean.	
October	796	429	503	30,900
November	706	429	570	33,900
December	610	526	581	35,700
January	735	385	490	30,100
February	534	373	416	23,100
March	927	461	600	36,900
April	2,690	756	1,620	96,400
May	4,470	1,040	1,910	117,000
June	2,390	861	1,460	86,900
July	896	431	614	37,800
August	604	541	574	35,300
September	590	455	490	29,200
The year	4,470	373	820	593,000

NOTE.—Monthly discharge computed by engineers of U. S. Geological Survey.

TRUCKEE RIVER AT RENO, NEV.

LOCATION.—In sec. 11, T. 19 N., R. 19 E., at Virginia Street Bridge in Reno, Washoe County, 6 miles above mouth of Steamboat Creek, and 12 miles below the Nevada-California boundary.

DRAINAGE AREA.—1,070 square miles (measured on topographic maps).

RECORDS AVAILABLE.—July 1, 1906, to September 30, 1915.

GAGE.—Vertical staff fastened to retaining wall on left bank about 20 feet below bridge; datum 4,481.60 feet above sea level.

DISCHARGE MEASUREMENTS.—Made from the Rock Street Bridge 800 feet below gage or by wading.

CHANNEL AND CONTROL.—Bed composed of gravel and boulders; fairly permanent. One channel at all stages; river confined by retaining walls on either side.

EXTREMES OF DISCHARGE.—Maximum stage recorded during year, 4.6 feet May 13 (discharge, 3,900 second-feet); minimum stage, 0.2 foot July 21 (discharge, 36 second-feet).

1906–1915: Maximum stage recorded, 8.2 feet March 18, 1907 (discharge, 14,600 second-feet); minimum stage, —0.1 foot July 2 and 3, 1912 (discharge, 18 second-feet).

WINTER FLOW.—Stage-discharge relation seldom affected by ice.

DIVERSIONS.—Numerous diversions for Truckee Valley above and below station.

REGULATION.—Flow affected somewhat by the operation of several power plants above station, by storage at Lake Tahoe, and by irrigation diversions for Truckee Valley.

ACCURACY.—Records good.

COOPERATION.—Gage heights furnished by United States Weather Bureau.

The following discharge measurement was made by A. B. Purton:

August 27; Gage height, 0.80 foot; discharge, 125 second-feet.

Daily discharge, in second-feet, of Truckee River at Reno, Nev., for the year ending Sept. 30, 1915.

Day.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.
1	338	630	500	562	338	338	780	1,380	2,070	500	129	129
2	250	630	500	630	441	388	860	1,120	2,200	500	154	107
3	250	700	500	562	338	388	1,420	1,030	1,850	562	154	129
4	250	700	500	562	388	388	1,420	860	1,520	562	154	154
5	250	630	500	562	338	388	1,220	860	1,520	441	129	129
6	250	441	500	562	338	388	940	780	1,630	441	154	129
7	250	441	500	562	338	388	940	780	1,850	388	129	154
8	250	441	500	500	338	338	940	860	2,070	388	129	129
9	250	388	500	441	338	338	940	1,030	1,960	130	154	154
10	250	388	500	388	388	338	1,220	2,070	1,740	338	154	107
11	293	441	500	388	441	388	1,630	3,200	1,630	293	154	107
12	250	441	500	500	338	388	2,070	3,720	1,220	293	182	284
13	293	441	500	500	338	388	2,460	3,900	1,320	215	129	88
14	293	441	500	441	293	500	1,520	2,740	1,030	215	154	72
15	250	500	500	388	338	500	1,420	2,070	940	156	129	88
16	250	500	500	293	388	500	1,850	2,200	940	107	129	88
17	250	441	500	388	388	562	2,200	2,200	940	72	154	88
18	250	441	562	388	338	500	2,330	1,960	940	88	129	88
19	250	500	562	441	338	562	2,460	1,630	860	58	129	72
20	250	562	500	388	293	562	2,600	1,520	780	58	129	72
21	338	562	500	388	293	562	2,200	1,120	780	36	129	72
22	293	562	500	388	293	630	1,850	1,030	700	247	129	72
23	250	562	562	388	338	700	1,740	1,120	700	213	107	72
24	250	630	562	388	338	860	1,420	1,030	700	129	129	72
25	293	700	500	388	338	860	1,320	1,030	562	154	129	107
26	388	500	500	338	338	940	1,220	1,030	562	129	154	154
27	441	500	562	293	293	780	1,120	1,220	441	182	154	129
28	500	500	562	338	338	860	1,630	1,520	441	154	129	107
29	500	500	562	338	......	940	1,630	1,850	500	182	129	88
30	630	500	562	338	......	780	1,630	1,740	562	182	129	88
31	441	......	562	338	......	700	......	1,850	......	182	107	......

NOTE.—Discharge determined from two well-defined rating curves, one used Oct. 1 to July 15 and the other July 16 to Sept. 30. Discharge on May 1 interpolated, as no gage reading was obtained.

Monthly discharge of Truckee River at Reno, Nev., for the year ending Sept. 30, 1915.

Month.	Discharge in second-feet.			Run-off (total in acre-feet).	Accuracy.
	Maximum.	Minimum.	Mean.		
October	630	250	308	18,900	B.
November	700	388	520	30,900	B.
December	562	500	518	31,900	B.
January	630	293	433	26,600	B.
February	441	293	344	19,100	B.
March	940	338	553	34,000	B.
April	2,600	780	1,570	93,400	B.
May	3,900	780	1,630	100,000	B.
June	2,200	441	1,170	69,600	B.
July	562	36	245	15,100	B.
August	182	107	138	8,480	B.
September	284	72	111	6,600	B.
The year	3,900	36	627	455,000	

TRUCKEE RIVER AT CLARKS, NEV.

LOCATION.—In the SE. ¼ sec. 26, T. 20 N., R. 22 E., at highway bridge about 600 feet from the Southern Pacific Railroad station at Clarks, Storey County.

DRAINAGE AREA.—1,740 square miles.

RECORDS AVAILABLE.—July 1, 1907, to June 6, 1910[1]; August 1, 1910, to September 30, 1915.

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[1] At Derby dam, where the discharge is practically the same as at Clarks.

GAGE.—Vertical staff on south abutment of bridge.

DISCHARGE MEASUREMENTS.—Made from highway bridge.

CHANNEL AND CONTROL.—Bed composed of rock and gravel; shifts occasionally.

EXTREMES OF DISCHARGE.—Maximum stage recorded during year, 7.40 feet May 13 (discharge, 4,320 feet); minimum stage, 2.00 feet July 21 and 24 (discharge, 150 second-feet).

1907–1915: Maximum mean daily discharge, 7,760 second-feet[1] January 1, 1914; minimum mean daily discharge, 65 second-feet August 9, 1913.

WINTER FLOW.—Stage-discharge relation not affected by ice.

DIVERSIONS.—Water is used for irrigation in Truckee Valley above station.

REGULATION.—Flow affected by the operation of several power plants above station and also by manipulation of the outlet gates of Lake Tahoe.

ACCURACY.—Records furnished by the United States Reclamation Service.

Discharge measurements of Truckee River at Clarks, Nev., during the year ending Sept. 30, 1915.

[Made by R. R. Hartley.]

Data.	Gage height.	Discharge.	Data.]	Gage height.	Discharge.
	Feet.	*Sec.-ft.*		*Feet.*	*Sec.-ft.*
June 18	2.85	1,024	July 21	2.00	136
July 20	2.10	180			

Daily discharge, in second-feet, of Truckee River at Clarks, Nev., for the year ending Sept. 30, 1915.

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.
1	460	460	870	810	630	605	1,750	1,830	2,225	705	320	320
2	480	480	870	810	630	605	1,830	1,630	2,135	730	280	340
3	460	460	840	755	606	580	2,270	1,510	2,135	705	260	340
4	500	520	840	780	605	580	1,670	1,430	2,000	730	220	320
5	520	540	810	780	606	580	1,590	1,430	2,045	705	180	280
6	540	600	810	755	630	605	1,550	1,350	2,090	540	165	280
7	580	630	840	755	655	580	1,430	1,330	2,180	580	165	240
8	560	655	840	780	680	605	1,390	1,350	2,225	540	180	220
9	540	680	870	810	705	605	1,315	2,710	2,090	440	200	220
10	540	680	870	755	730	580	1,315	3,160	2,045	420	220	240
11	580	705	840	755	730	580	1,430	3,280	2,090	520	220	260
12	580	705	840	730	705	580	1,830	3,840	1,790	480	180	280
13	560	755	840	730	706	605	1,955	4,320	1,630	440	180	260
14	540	755	780	755	755	655	2,045	2,270	1,590	400	220	280
15	540	780	810	780	840	705	2,180	2,660	1,550	340	220	340
16	580	810	810	755	930	730	2,225	2,710	1,390	360	180	340
17	580	810	840	680	1,020	780	2,270	2,760	1,280	340	220	320
18	580	810	870	655	1,080	780	2,180	2,910	1,210	260	220	300
19	560	840	570	655	990	730	2,135	2,710	1,175	200	180	300
20	560	930	600	630	900	755	2,090	1,630	1,060	180	180	320
21	580	930	705	605	870	840	2,090	1,710	960	150	200	300
22	560	930	730	605	840	870	2,045	1,710	840	220	260	280
23	540	900	730	602	730	900	2,000	1,790	960	180	300	300
24	540	930	755	605	706	980	2,000	1,830	930	150	300	320
25	560	930	755	630	706	930	1,955	2,045	840	200	280	320
26	580	900	730	605	680	930	1,910	2,000	780	260	300	320
27	580	900	780	605	655	930	1,910	2,000	730	300	320	340
28	580	930	755	630	630	1,590	1,870	2,045	705	300	320	340
29	560	930	755	630	......	1,280	1,910	2,090	705	320	300	360
30	580	900	755	605	......	1,430	1,910	2,180	680	340	280	340
31	600	......	780	605	......	1,590	......	2,225	......	340	300	......

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[1] Discharge at Reno Mar. 18, 1907, 14,600 second-feet.

Monthly discharge of Truckee River at Clarks, Nev., for the year ending Sept. 30, 1915.

Month.	Discharge in second-feet.			Run-off (total in acre-feet).
	Maximum.	Minimum.	Mean.	
October	600	460	550	33,800
November	960	460	762	45,300
December	870	600	800	49,200
January	810	602	698	42,900
February	1,080	605	750	41,700
March	1,590	580	808	49,700
April	2,270	1,315	1,870	111,000
May	4,320	1,330	2,210	136,000
June	2,225	680	1,470	87,500
July	730	150	399	24,500
August	320	165	237	14,600
September	360	220	300	17,900
The year	4,320	150	903	654,000

NOTE.—Monthly discharge computed by engineers of the U. S. Geological Survey.

DONNER CREEK NEAR TRUCKEE, CAL.

LOCATION.—In the NE. ¼ sec. 17, T. 17 N., R. 16 E., below dam of Donner Creek Ice Co., below mouth of Cold Creek, and 1½ miles west of Truckee, Nevada County.

DRAINAGE AREA.—30 square miles.

RECORDS AVAILABLE.—October 23, 1902, to September 30, 1915, when station was discontinued.

GAGE.—Inclined staff on left bank, 375 feet below dam; read by an employee of United States Reclamation Service. Previous to June 1, 1909, several gages, having different datums, were used.

DISCHARGE MEASUREMENTS.—Made from cable at gage or by wading.

CHANNEL AND CONTROL.—Bed composed of gravel; shifts somewhat during high water.

EXTREMES OF DISCHARGE.—Maximum stage recorded during year, 2.1 feet May 13 and 14 (discharge, 518 second-feet); minimum stage, no flow March 4–13.

1902–1915: Maximum stage recorded, 5.5 feet March 18, 1907 (discharge, 980 second-feet); minimum stage, creek dry during parts of almost every year.

WINTER FLOW.—Stage-discharge relation affected at times by ice.

DIVERSIONS.—Not known.

REGULATION.—Flow is controlled by operation of outlet gates at dam.

ACCURACY.—Records fair.

COOPERATION.—Gage-height record furnished by United States Reclamation Service.

Discharge measurements of Donner Creek near Truckee, Cal., during the year ending Sept. 30, 1915.

[Made by H. J. Tompkins.]

Date.	Gage height.	Discharge.	Date.	Gage height.	Discharge.
	Feet.	*Sec.-ft.*		*Feet.*	*Sec.-ft.*
Dec. 4	[a]—0.45	3.5	Aug. 9	—.26	11
Mar. 27	+.34	46			

[a] Some ice on control.

Daily discharge, in second-feet, of Donner Creek near Truckee, Cal., for the year ending Sept. 30, 1915.

Day	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1	....	20	7.0	52	62	217	350	103	17	10
2	....	20	20	52	73	165	389	87	17	10
3	....	20	15	52	103	142	313	87	7.5	10
4	3.7	20	10	.0	95	142	313	82	7.5	10
5	....	20	7.0	.0	87	165	313	77	6.0	10
6	....	20	10	.0	87	165	246	72	6.0	10
7	....	20	10	.0	87	217	246	67	13	10
8	....	20	7.0	.0	95	246	246	62	13	10
9	....	20	3.0	.0	112	313	217	57	13	10
10	....	32	7.0	.0	132	389	246	52	13	10
11	....	32	20	.0	190	473	217	47	13	10
12	....	32	142	.0	165	473	217	42	13	10
13	....	32	142	.0	165	518	190	37	10	10
14	....	41	103	28	165	518	165	32	10	10
15	....	41	103	28	246	473	165	27	10	10
16	....	41	103	35	313	473	165	22	10	10
17	....	41	62	35	370	389	165	22	10	10
18	....	41	62	43	370	389	142	22	10	10
19	....	32	62	43	350	389	142	22	10	10
20	....	20	52	52	313	389	165	22	10	10
21	....	20	52	52	313	350	165	22	10	7.5
22	....	20	52	52	313	313	142	22	10	7.5
23	....	20	43	52	278	246	142	22	10	7.5
24	....	15	43	52	246	246	142	22	10	7.5
25	....	15	43	52	217	246	142	22	10	7.5
26	....	15	43	57	217	217	142	22	10	7.5
27	....	10	52	57	246	278	121	22	7.5	7.5
28	....	10	52	73	246	278	121	17	7.5	7.5
29	....	10	....	62	217	278	121	17	7.5	7.5
30	....	10	....	62	217	278	121	17	7.5	7.5
31	....	20	....	73	....	313	....	17	7.5	....

NOTE.—Discharge determined from two fairly well defined rating curves, applicable Oct. 1 to Feb. 12 and Feb. 13 to Sept. 30. No record Oct. 1 to Dec. 3 and Dec. 5–29. Discharge July 4 to 15 interpolated.

Monthly discharge of Donner Creek near Truckee, Cal., for the year ending Sept. 30, 1915.

[Drainage area, 30 square miles.]

Month.	Discharge in second-feet.				Run-off.		Accuracy.
	Maximum.	Minimum.	Mean.	Per square mile.	Depth in inches on drainage area.	Total in acre-feet.	
January	41	10	23.5	0.783	0.90	1,440	B.
February	142	3.0	47.4	1.58	1.65	2,630	C.
March	73	.0	34.3	1.14	1.31	2,110	C.
April	370	62	203	6.77	7.55	12,100	B.
May	518	142	313	10.4	11.99	19,200	B.
June	389	121	199	6.63	7.40	11,800	B.
July	103	17	40.7	1.36	1.57	2,500	D
August	17	6.0	10.2	.340	.39	627	C.
September	10	7.5	9.17	.306	.34	546	C.
The period	....	....	....	....	....	53,000	

LITTLE TRUCKEE RIVER AT BOCA, CAL.

LOCATION.—In sec. 28, T. 18 N., R. 17 E., at Boca, Nevada County, 150 feet above mouth of stream, and 500 feet below ice-pond dam.

DRAINAGE AREA.—Not measured.

RECORDS AVAILABLE.—January 1, 1911, to September 30, 1915, when station was discontinued. At Pine Station and Starr, 1903–1910.

GAGE.—Inclined staff on left bank 100 feet above railroad bridge; read by an employee of the United States Reclamation Service.

Discharge measurements.—Made from cable at gage or by wading.

Channel and control.—Bed composed of gravel; shifts during high water.

Extremes of discharge.—Maximum stage recorded during year, 3.9 feet May 12 (discharge, 1,600 second-feet); minimum stage, 0.05 foot September 12–30 (discharge, 14 second-feet).

1906–1915: Maximum stage recorded, 4.9 feet April 15, 1914 (discharge, 2,360 second-feet); minimum stage, river dry September 26 to October 5 and October 10, 1911, September 6 and 7 and October 6–13, 1913.

Winter flow.—Open-channel rating curve assumed applicable.

Diversions.—There is a small diversion for power just above station. The plant is operated only during the night and water is returned to river below gage.

Regulation.—Flow regulated by gates in dam.

Accuracy.—Records fair even though regulation at dam and operation of power plant tend to make record unsatisfactory.

Cooperation.—Gage-height record furnished by United States Reclamation Service.

Discharge measurements of Little Truckee River at Boca, Cal., during the year ending Sept. 30, 1915.

[Made by H. J. Tompkins.]

Date.	Gage height.	Discharge.	Date.	Gage height.	Discharge.
	Feet.	*Sec.-ft.*		*Feet.*	*Sec.-ft.*
Dec. 4	0.46	28	Aug. 9	0.26	19
Mar. 27	1.54	188			

Daily discharge, in second-feet, of Little Truckee River at Boca, Cal., for the year ending Sept. 30, 1915.

Day.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.
1	29	38	49	16	27	49	283	690	815	283	29	15
2	29	34	49	18	29	49	470	370	815	243	29	15
3	29	34	29	18	38	45	660	370	630	207	25	15
4	29	34	29	18	29	45	520	370	520	207	25	15
5	29	32	41	20	29	41	305	325	575	207	25	15
6	29	32	41	21	34	41	370	325	630	175	25	15
7	29	34	27	25	38	45	370	325	690	148	21	15
8	29	32	20	25	38	45	420	370	815	148	21	15
9	32	32	25	23	41	45	495	470	750	148	21	15
10	32	34	34	23	38	45	548	880	690	124	21	15
11	34	34	34	23	41	45	750	1,370	575	124	21	15
12	38	32	25	25	41	41	880	1,600	470	124	18	14
13	38	32	25	29	45	148	750	1,230	420	108	18	14
14	38	34	27	32	38	54	575	880	370	108	18	14
15	38	32	27	27	41	70	690	750	283	85	21	14
16	38	32	25	25	41	78	750	815	370	70	21	14
17	38	32	21	25	49	85	782	815	470	70	21	14
18	34	32	21	25	49	85	815	815	420	58	18	14
19	34	25	21	23	45	94	815	630	370	58	18	14
20	34	20	21	23	41	94	848	520	325	49	18	14
21	38	18	18	25	41	108	750	470	283	49	15	14
22	38	20	20	23	45	124	630	420	243	49	18	14
23	34	20	20	21	45	148	602	470	283	41	15	14
24	34	21	21	22	45	191	520	470	283	85	18	14
25	38	23	20	21	49	225	750	420	283	70	21	14
26	38	23	20	21	45	207	600	370	243	49	21	14
27	34	21	18	23	45	191	630	470	243	41	18	14
28	32	21	18	23	49	283	960	575	207	34	15	14
29	34	21	18	25	......	207	960	630	243	34	15	14
30	41	23	16	25	......	175	960	630	243	34	15	14
31	38	......	16	27	......	225	......	690	......	29	18	......

Note.—Discharge determined from a fairly well defined rating curve.

Monthly discharge of Little Truckee River at Boca, Cal., for the year ending Sept. 30, 1915.

Month.	Discharge in second-feet.			Run-off (total in acre-feet).	Accuracy.
	Maximum.	Minimum.	Mean.		
October	41	29	34.2	2,100	C.
November	38	18	28.4	1,690	C.
December	49	16	25.7	1,580	C.
January	32	16	23.2	1,430	C.
February	49	27	40.6	2,250	B.
March	283	41	107	6,580	B.
April	950	283	654	38,900	B.
May	1,600	325	630	38,700	B.
June	815	207	452	26,900	B.
July	283	29	105	6,460	B.
August	29	15	20.1	1,240	C.
September	15	14	14.4	857	C.
The year	1,600	14	178	129,000	

HONEY LAKE BASIN.

GOLD RUN CREEK NEAR SUSANVILLE, CAL.

Location.—In the NE. ¼ sec. 17, T. 29 N., R. 12 E., at bridge on county road, at Ridenour & Sons' ranch, about 2½ miles southeast of Susanville, Lassen County.

Drainage area.—Not measured.

Records available.—February 24 to March 31, 1913, and March 21 to September 30, 1915.

Gage.—Vertical staff mailed to upper side of right bridge abutment; read twice daily by S. D. Ridenour. Gage used in 1913 was at same site but different datum.

Discharge measurements.—Made by wading or from bridge.

Channel and control.—Bed composed of gravel and small boulders; shifts frequently.

Extremes of discharge.—Maximum stage recorded during year, above gage May 11 and 12 (discharge not known); minimum stage, below lower limit of gage August 15 to September 30 (discharge, less than 2.0 second-feet).

Winter flow.—Stage-discharge relation probably affected by ice.

Diversions.—Not known.

Regulation.—Not known.

Accuracy.—Rating curve fairly well defined, but some of the discharge measurements were not made according to standard methods and, although they have been corrected by means of comparative measurements, may still be in erorr. Records fair.

Discharge measurements of Gold Run Creek near Susanville, Cal., during the year ending Sept. 30, 1915.

Date.	Made by—	Gage height.	Discharge.	Date.	Made by—	Gage height.	Discharge.
		Feet.	*Sec.-ft.*			*Feet.*	*Sec.-ft.*
Mar. 21	McKay and Crandall	0.48	11.9	Apr. 30	Thad McKay	1.14	25.1
31	Thad McKay	.58	12.6	May 13	.....do	2.56	104
Apr. 5	.....do	.56	11.8	June 12	.....do	.98	13.2
13	.....do	.64	19.1	12	.....do	.98	13.2
21	.....do	1.18	16.7				

Daily discharge, in second-feet, of Gold Run Creek near Susanville, Cal., for the year ending Sept. 30, 1915.

Day.	Mar.	Apr.	May.	June.	July.	Aug.	Day.	Mar.	Apr.	May.	June.	July.	Aug.
1	......	13	18	25	4.7	2.8	16	......	15	60	11	3.4	......
2	......	13	15	27	4.6	2.6	17	......	19	63	10	3.2	......
3	......	15	13	28	4.4	2.6	18	......	20	57	8.5	3.2	......
4	......	13	13	23	4.3	2.5	19	......	23	50	8.5	3.2	......
5	......	12	13	23	4.2	2.4	20	......	22	28	7.8	3.0	......
6	......	12	13	27	4.4	2.6	21	11	18	22	8.5	5.6	......
7	......	12	13	24	4.4	2.6	22	12	16	19	7.8	4.0	......
8	......	12	12	23	4.4	2.5	23	12	14	18	7.0	3.4	......
9	......	12	18	20	4.4	2.5	24	13	12	18	7.0	3.3	......
10	......	12	52	19	3.9	2.6	25	13	12	19	6.0	3.1	......
11	......	13	175	18	3.6	2.4	26	12	12	17	5.5	3.4	......
12	......	15	140	15	3.6	2.4	27	12	17	19	5.0	3.4	......
13	......	14	98	13	3.4	2.2	28	18	23	22	5.0	2.8	......
14	......	13	72	11	3.2	2.0	29	15	52	28	5.0	2.8	......
15	......	13	57	11	3.2	......	30	13	27	27	5.0	2.6	......
							31	13	......	24	......	2.9	......

NOTE.—Discharge determined from a fairly well defined rating curve; gage heights Apr. 17-28 and June 3 to Aug. 14 were corrected for backwater, due to temporary dam in the creek below station, before applying the rating table.

Monthly discharge of Gold Run Creek near Susanville, Cal., for the year ending Sept. 30, 1915.

Month.	Discharge in second-feet.			Run-off (total in acre-feet).	Accuracy.
	Maximum.	Minimum.	Mean.		
March 21-31	18	11	13.1	286	B.
April	52	10	16.5	982	C.
May	175	12	39.1	2,400	C.
June	28	5.0	13.8	821	C.
July	5.6	2.6	3.68	226	C.
August 1-14	2.8	2.0	2.48	69	D.
The period	....	....	....	4,780	

LASSEN CREEK NEAR SUSANVILLE, CAL.

LOCATION.—In the NW. ¼ sec. 22, T. 29 N., R. 12 E., at Drake ranch, about 2½ miles southeast of Johnstonville, and 4½ miles southeast of Susanville, Lassen County.

DRAINAGE AREA.—Not measured.

RECORDS AVAILABLE.—March 13 to April 14, 1913, and March 21 to September 30, 1915.

GAGE.—Staff gage on right bank; read twice daily by Jesse Drake, jr. Gage used in 1913 was a staff gage nailed to bent of highway bridge 1½ miles downstream and at different datum.

DISCHARGE MEASUREMENTS.—Made by wading.

CHANNEL AND CONTROL.—Bed composed of firm clay, shifts frequently. Banks subject to overflow at high water.

EXTREMES OF DISCHARGE.—Maximum stage recorded during year, 3.56 feet at 8 a. m. May 11 (discharge, 50 second-feet); minimum stage, probably no flow from middle of August to end of September.

WINTER FLOW.—Stage-discharge relation probably affected by ice.

DIVERSIONS.—Water is diverted above station for irrigation.

REGULATION.—Not known.

ACCURACY.—Records poor.

Discharge measurements of Lassen Creek near Susanville, Cal., during the year ending Sept. 30, 1915.

Date.	Made by—	Gage height.	Discharge.	Date.	Made by—	Gage height.	Discharge.
		Feet.	*Sec.-ft.*			*Feet.*	*Sec.-ft.*
Mar. 21	McKayland Crandall...	1.40	2.2	Apr. 21	Thad McKay..........	1.28	1.7
29	Thad McKay..........	1.58	5.8	30	.....do..................	1.38	3.2
Apr. 5	.....do..................	1.46	2.8	May 13	.....do..................	2.18	15
12	.....do..................	1.40	2.9	June 12	.....do..................	1.06	.2

Daily discharge, in second-feet, of Lassen Creek near Susanville, Cal., for the year ending Sept. 30, 1915.

Day.	Mar.	Apr.	May.	June.	July.	Aug.	Day.	Mar.	Apr.	May.	June.	July.	Aug.
1	......	3.0	2.6	2.4	0.04	0.06	16	......	2.4	4.2	1.0	.04	......
2	......	2.5	1.7	2.1	.03	.05	17	......	1.4	6.5	1.8	.03	......
3	......	2.8	1.3	1.2	.04	.06	18	......	1.4	5.8	2.4	.03	......
4	......	3.0	2.4	1.4	.04	.05	19	......	.9	5.1	2.4	.04	......
5	......	3.3	1.0	1.3	.07	.06	20	......	1.2	4.3	2.4	.05	......
6	......	2.7	.8	1.4	.10	.05	21	2.2	1.9	3.3	.7	.04	......
7	......	2.3	1.0	1.3	.08	.04	22	2.4	2.1	3.3	.07	.06	......
8	......	2.4	1.8	1.3	.09	.03	23	2.6	1.8	3.4	.01	.05	......
9	......	2.4	5.1	.6	.10	.02	24	2.5	1.0	3.3	.03	.06	......
10	......	2.8	16	.2	.11	.05	25	2.4	.6	2.9	.03	.01	......
11	......	3.5	42	.6	.09	.06	26	2.7	.7	2.5	.03	.04	......
12	......	3.8	34	.4	.09	.06	27	3.0	.7	2.1	.03	.05	......
13	......	3.6	18	.6	.12	.06	28	11	1.0	2.4	.03	.04	......
14	......	3.0	12	1.1	.07	.06	29	6.4	3.7	2.6	.05	.04	......
15	......	2.9	6.8	1.5	.08	......	30	3.4	3.2	2.4	.05	.04	......
							31	3.2	......	2.6	......	.06	......

NOTE.—Discharge determined from five poorly defined rating curves covering the following periods: Mar 21–27; Mar. 28 and 29; Mar. 30 to Apr. 7; Apr. 11–22 and Apr. 24 to Aug. 14. Discharge determined by indirect method of shifting control Apr. 8 to 10 and 23.

Monthly discharge of Lassen Creek near Susanville, Cal., for the year ending Sept. 30, 1915.

Month.	Discharge in second-feet.			Run-off (total in acre-feet).	Accuracy.
	Maximum.	Minimum.	Mean.		
March 21-31	11	2.2	3.80	83	D.
April	3.8	.6	2.27	135	D.
May	42	.8	6.55	403	D.
June	2.4	.01	.95	57	D.
July	.12	.01	.06	4	
August 1-14	.06	.02	.05	1	
September	....	....	....	....	
The period	....	....	....	683	

BAXTER CREEK NEAR JANESVILLE, CAL.

Location.—In the NE. ¼ SW. ¼ sec. 32, T. 29 N., R. 13 E., 200 feet west of the bridge on county road at ranch of D. J. Sweeny, and 2½ miles northwest of Janesville, Lassen County.

Records available.—February 17, 1913, to July 24, 1915.

Gage.—Inclined staff on left bank; read twice daily by D. J. Sweeny. March 21, 1915, gage was moved downstream 400 feet; original datum not maintained.

Discharge measurements.—Made from footbridge or by wading.

Channel and control.—Bed composed of gravel and small boulders; somewhat shifting. An artificial control, effective at low stages, was constructed March 21, 1915, when station was moved 400 feet downstream.

Extremes of discharge.—Maximum stage recorded during year, 6.6 feet at noon May 11 (discharge determined from extension of rating curve, 178 second feet); minimum stage, 1.40 feet (gage installed March 21, 1915) June 20–22 and June 24 to July 24 (discharge, 0.4 second-foot).

1913–1915: Maximum stage recorded, 9.6 feet at 5 p. m. January 25, 1914 (discharge, 360 second-feet); minimum stage, 0.5 foot August 9–31, 1914, June 20–22 and June 24 to July 24, 1915 (discharge, 0.4 second-foot).

Winter flow.—Probably slightly affected by ice for short periods.

Diversions.—Not known.

Regulation.—Not known.

Accuracy.—Records fair. Stage-discharge relation affected at times by the growth of aquatic plants.

Discharge measurements of Baxter Creek, near Janesville, Cal., during the years ending Sept. 30, 1914–15.

Date.	Made by—	Gage height.[a]	Gage height.[b]	Discharge.
1914.		*Feet.*	*Feet.*	*Sec.-ft.*
July 26	L. W. Jordan	0.80	....	0.3
1915.				
Mar. 20	Lynn Crandall	1.21	1.92	5.5
22	.....do	1.26	1.96	6.5
29	Thad McKay	1.70	2.25	11.3
Apr. 5	.....do	1.55	2.15	9.0
12	.....do	1.70	2.20	10.6
20	.....do	1.76	2.31	12.6
30	.....do	2.11	2.59	18.7
May 11	.....do	5.20	5.47	121
13	.....do	3.36	3.71	43.1
14	.....do	2.96	3.32	25.6
June 12	.....do	1.30	1.85	4.7

[b] New gage established Mar. 21, 1915.
[a] Old gage.

Daily discharge, in second-feet, of Baxter Creek near Janesville, Cal., for the years ending Sept. 30, 1914 and 1915.

[D. J. Sweeney, observer.]

Day.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.
1913-14.												
1	3.5	5.0	5.9	190	15	76	31	43	36	5.5	0.5	0.5
2	3.5	5.4	5.9	242	14	44	30	40	33	5.0	.5	.5
3	3.5	5.4	5.9	101	14	46	30	43	31	4.0	.5	.5
4	3.5	5.4	5.9	85	16	41	38	47	30	4.0	.5	.5
5	3.5	5.4	5.9	64	14	44	39	52	27	3.0	.5	.5
6	3.5	5.4	5.9	57	14	46	40	50	28	2.0	.5	.5
7	3.5	5.4	5.9	57	14	41	40	47	33	2.0	.5	.5
8	3.5	5.4	5.9	57	14	38	38	46	32	2.0	.4	.5
9	3.5	5.4	5.9	31	14	38	47	44	31	2.0	.4	.5
10	3.5	6.4	5.9	22	19	40	50	48	29	1.6	.4	.5
11	3.5	5.4	5.9	19	27	36	54	55	29	1.6	.4	.5
12	3.5	5.4	7.4	18	22	40	50	52	26	1.6	.4	.5
13	3.5	6.4	7.4	14	23	38	54	57	24	1.6	.4	.5
14	3.5	6.9	6.9	142	24	39	55	62	22	1.6	.4	.5
15	3.5	5.9	6.9	68	25	36	59	60	19	1.6	.4	.5
16	3.5	5.9	6.9	43	27	38	59	50	17	1.6	.4	.5
17	3.5	5.4	6.4	37	28	34	52	55	15	1.6	.4	.5
18	3.5	5.4	6.4	37	46	35	50	52	20	1.6	.4	.5
19	3.5	5.4	6.4	27	111	33	54	50	26	1.6	.4	.5
20	3.8	5.4	6.4	28	210	33	62	52	22	1.6	.4	.6
21	4.0	5.4	7.4	64	200	32	64	57	19	.8	.4	.6
22	4.6	5.4	9.0	214	102	31	59	57	18	.8	.4	.6
23	4.6	5.4	9.6	142	64	38	59	55	19	.8	.4	.6
24	4.6	5.4	9.6	184	57	38	59	54	18	.8	.4	.6
25	4.6	5.4	8.5	252	52	33	55	55	16	.8	.4	.6
26	4.6	6.9	8.5	111	47	35	57	44	14	.8	.4	.6
27	4.6	7.4	8.5	29	36	33	59	43	13	.8	.4	.6
28	4.6	6.4	9.6	17	44	31	52	41	12	.8	.4	.6
29	4.6	5.9	9.6	17	......	31	50	40	8.1	.7	.4	.6
30	4.6	5.9	15	15	......	29	48	38	5.5	.6	.4	.6
31	4.6	......	119	15	......	30	......	38	......	.5	.4	......
1914-15.												
1	.6	3.4	3.9	2.6	25	11	7.9	13	13	.4	......	......
2	.6	3.4	3.4	2.6	38	12	8.8	9.7	13	.4	......	......
3	.7	3.4	3.4	3.4	9.8	12	9.2	9.0	12	.4	......	......
4	.7	3.4	4.4	4.4	8.6	9.8	9.7	13	11	.4	......	......
5	.8	3.4	3.9	4.9	6.4	9.2	9.7	9.5	10	.4	......	......
6	.8	3.4	3.9	4.9	6.4	8.6	8.4	8.8	9.2	.4	......	......
7	.9	3.4	3.4	4.9	6.4	6.9	7.4	9.7	7.9	.4	......	......
8	2.0	3.4	3.4	4.9	40	6.9	7.9	9.7	6.7	.4	......	......
9	2.4	3.4	3.4	3.9	26	9.8	7.9	18	5.6	.4	......	......
10	2.6	3.4	3.4	3.9	12	8.6	8.4	34	5.0	.4	......	......
11	2.6	3.4	3.4	4.9	8.0	8.0	8.8	108	3.9	.4	......	......
12	2.6	3.4	3.4	4.9	6.9	8.6	10	91	4.2	.4	......	......
13	2.6	3.4	3.4	12	6.4	9.2	9.7	52	4.2	.4	......	......
14	2.6	3.4	3.4	8.6	6.4	9.2	7.4	38	3.3	.4	......	......
15	2.6	3.0	3.4	5.9	6.4	9.8	7.0	32	1.9	.4	......	......
16	2.6	3.0	3.4	3.9	25	9.2	7.9	32	1.6	.4	......	......
17	3.9	3.0	3.4	3.0	44	10	9.7	32	1.1	.4	......	......
18	2.6	3.0	3.4	2.2	22	10	11	30	.7	.4	......	......
19	5.9	3.0	3.4	2.2	13	8.6	11	27	.5	.4	......	......
20	5.4	3.0	3.4	2.2	19	5.9	12	24	.4	.4	......	......
21	4.9	3.4	3.4	2.6	8.6	5.3	12	22	.4	.4	......	......
22	3.4	3.0	3.4	2.6	7.4	5.6	12	24	.4	.4	......	......
23	3.4	3.0	3.4	2.6	7.4	7.0	8.8	24	.5	.4	......	......
24	3.4	3.0	3.4	3.0	8.6	7.9	7.0	23	.4	.4	......	......
25	3.4	3.4	3.4	3.9	11	8.4	6.2	20	.4	......	......	......
26	3.4	3.4	3.4	3.9	11	8.4	6.2	19	.4	......	......	......
27	2.6	3.4	3.4	4.9	7.4	8.8	7.0	20	.4	......	......	......
28	2.6	3.9	3.4	4.9	16	16	10	21	.4	......	......	......
29	2.6	4.9	3.4	5.4	......	18	22	21	.4	......	......	......
30	2.6	4.4	3.4	6.4	......	9.7	18	19	.4	......	......	......
31	3.4	......	3.4	7.4	......	8.4	......	15	......	......	......	......

NOTE.—Discharge determined from several fairly well-defined rating curves applicable as follows: Oct. 1, 1913, to Jan. 23, 1914; Jan. 25 to June 25, 1914; June 26 to Sept. 30, 1914; Oct. 10, 1914, to Mar. 20, 1915; and Mar. 21 to July 24, 1915. Discharge estimated Jan. 24, 1914. Discharge Oct. 1-9, 1914, estimated from gage heights and noted conditions of aquatic growth and sand deposits in stream.

Monthly discharge of Baxter Creek, near Janesville, Cal., for the years ending Sept. 30, 1914–15.

Month.	Discharge in second-feet.			Run-off (total in acre-feet).	Accuracy.
	Maximum.	Minimum.	Mean.		
1913–14.					
October	4.6	3.5	3.88	239	D.
November	7.4	5.0	5.72	340	D.
December	119	5.9	11.0	676	C.
January	252	14	77.4	4,760	C.
February	210	14	46.2	2,570	B.
March	76	29	38.0	2,340	B.
April	64	30	50.1	2,980	B.
May	62	38	49.5	3,040	B.
June	36	5.5	22.4	1,330	C.
July	5.5	.5	1.78	109	D.
August	.5	.4	.42	26	D.
September	.6	.5	.54	32	D.
The year	252	.4	25.5	18,400	
1914–15.					
October	5.9	0.6	2.62	161	D.
November	4.9	3.0	3.38	201	D.
December	4.4	3.4	3.48	214	D.
January	12	2.2	4.45	274	D.
February	44	6.4	14.8	822	C.
March	16	5.3	9.09	559	B.
April	22	6.2	9.68	573	B.
May	108	8.8	26.7	1,640	B.
June	13	.4	3.98	237	C.
July 1–24	.4	.4	.40	19	
The period	....	....	....	4,700	

SCHLOSS CREEK AT JANESVILLE, CAL.

Location.—In the N. ½ SW. ¼ sec. 9, T. 28 N., R. 13 E., about half a mile above road crossing at schoolhouse in Janesville, Lassen County.

Drainage area.—Not measured.

Records available.—March 22 to June 30, 1915, when station was discontinued.

Gage.—Vertical staff on left bank; read once daily by Harold Bradford.

Discharge measurements.—Made by wading at gage.

Channel and control.—Bed composed of loose gravel.

Extremes of discharge.—Maximum stage recorded during period, 2.7 feet at 4 p. m. May 11 (discharge, 7.6 second-feet); minimum stage, 2.1 feet at 7 a. m. June 23 (discharge, zero second-foot).

Winter flow.—No records.

Diversions.—None above station.

Regulation.—None above station.

Accuracy.—Records fair.

Discharge measurements of Schloss Creek at Janesville, Cal., during the year ending Sept. 30, 1915.

Date.	Made by—	Gage height.	Discharge.	Date.	Made by—	Gage height.	Discharge.
		Feet.	*Sec.-ft.*			*Feet.*	*Sec.-ft.*
Mar. 22	Lynn Crandall	2.30	0.3	Apr. 20	Thad McKay	2.32	1.4
29	Thad McKay	2.40	1.1	30	.....do	2.30	1.0
Apr. 5	.....do	2.38	.8	May 12	.....do	2.55	4.6
12	.....do	2.38	1.1	June 12	.....do	2.24	.4

Daily discharge, in second-feet, of Schloss Creek at Janesville, Cal., for the year ending Sept. 30, 1915.

Day.	Mar.	Apr.	May.	June.	Day.	Mar.	Apr.	May.	June.
1		0.8	3.1	1.1	16		0.7	2.3	0.1
2		.8	2.3	1.1	17		1.3	2.3	.2
3		.8	1.7	1.1	18		1.4	1.7	.1
4		.8	3.1	.6	19		1.6	1.1	.2
5		.7	2.3	1.1	20		1.7	1.1	.1
6		.3	1.7	1.1	21		1.7	1.1	.1
7		.3	1.1	1.1	22	0.3	1.7	1.1	.1
8		.3	1.1	1.1	23	.3	1.7	1.1	.0
9		.3	2.3	1.1	24	.8	1.1	1.7	.1
10		.3	3.1	1.1	25	.8	1.1	1.1	.2
11		.3	7.6	.6	26	.8	1.1	1.1	.1
12		.8	4.8	.6	27	.8	1.1	1.1	.2
13		.9	3.9	.6	28	1.3	1.1	1.7	.2
14		.5	3.9	.2	29	1.3	2.3	1.1	.1
15		.6	3.1	.2	30	1.3	3.1	1.1	.1
					31	1.3		.6	

NOTE.—Discharge determined from two fairly well-defined rating curves applicable Mar. 21 to Apr. 12 and Apr. 20 to June 30. Indirect method for shifting control used Apr. 13-19.

Monthly discharge of Schloss Creek at Janesville, Cal., for the year ending Sept. 30, 1915.

Month.	Discharge in second-feet.			Run-off (total in acre-feet).	Accuracy.
	Maximum.	Minimum.	Mean.		
March 22-31	1.3	0.3	0.90	18	C.
April	3.1	.3	1.04	62	D.
May	7.6	.6	2.14	132	D.
June	1.1	.0	.49	29	D.
The period				241	

JANESVILLE CREEK AT JANESVILLE, CAL.

LOCATION.—In the SW. ¼ sec. 9, T. 28 N., R. 13 E., about 50 feet from the old Masonic Building at the town of Janesville, Lassen County.

DRAINAGE AREA.—Not measured.

RECORDS AVAILABLE.—March 3 to June 7, 1913, and March 22, to June 30, 1915, when station was discontinued.

GAGE.—Staff gage nailed to cottonwood tree on left bank; read once daily by Harold Bradford.

DISCHARGE MEASUREMENTS.—Made by wading.

CHANNEL AND CONTROL.—Composed of gravel and sand; probably shifting.

EXTREMES OF DISCHARGE.—Maximum stage recorded during year, 1.9 feet at 4 p. m. May 11 (discharge, 8.3 second-feet); minimum stage, 1.15 feet at 4 p. m. June 29, and 6 p. m. June 30 (discharge, 0.4 second-feet).

WINTER FLOW.—Stage-discharge relation probably affected by ice.

DIVERSIONS.—Not known.

REGULATION.—Not known.

ACCURACY.—Records poor.

Discharge measurements of Janesville Creek at Janesville, Cal., during the year ending Sept. 30, 1915.

Date.	Made by—	Gage height.	Discharge.	Date.	Made by—	Gage height.	Discharge.
		Feet.	*Sec.-ft.*			*Feet.*	*Sec.-ft.*
Mar. 22	Lynn Crandall	1.40	1.6	Apr. 20	Thad McKay	1.60	2.3
29	Thad McKay	1.48	1.4	30	.....do	1.50	1.6
Apr. 5	.....do	1.45	1.4	May 12	.....do	1.80	6.8
12	.....do	1.40	1.8	June 12	.....do	1.30	.8

Daily discharge, in second-feet, of Janesville Creek at Janesville, Cal., for the year ending Sept. 30, 1915.

Day.	Mar.	Apr.	May.	June	Day.	Mar.	Apr.	May.	June.
1		1.5	2.6	1.2	16		2.1	3.1	.9
2		1.4	2.6	1.2	17		2.1	2.6	.7
3		1.8	2.1	1.4	18		1.8	2.6	.7
4		1.4	3.1	1.4	19		2.1	2.1	.5
5		1.4	2.6	1.4	20		2.6	2.1	.7
6		1.4	2.1	1.2	21		2.1	1.8	.7
7		1.4	1.8	1.2	22	1.4	2.1	1.4	.5
8		1.4	1.8	1.4	23	1.4	2.1	1.4	.5
9		1.8	1.8	1.4	24	1.8	2.1	1.4	.5
10		1.8	2.1	1.4	25	1.8	2.1	1.4	.5
11		2.0	8.3	1.4	26	1.8	2.1	1.4	.5
12		2.1	6.1	1.2	27	1.8	1.8	1.4	.7
13		2.1	5.2	1.2	28	2.1	2.6	1.4	.5
14		1.8	4.4	1.2	29	1.8	3.1	1.8	.4
15		1.8	3.1	1.4	30	1.8	3.1	1.4	.4
					31	1.8		1.4	

NOTE.—Discharge determined from a poorly defined rating curve.

Monthly discharge of Janesville Creek at Janesville, Cal., for the year ending Sept. 30, 1915.

Month.	Discharge in second-feet.			Run-off (total in acre-feet).	Accuracy.
	Maximum.	Minimum.	Mean.		
March 22–31	2.1	1.4	1.75	35	D.
April	3.1	1.4	1.97	117	D.
May	8.3	1.4	2.53	156	D.
June	1.4	.4	.94	56	D.
The period				364	

WARNER LAKES BASIN.

TWENTYMILE CREEK NEAR WARNER LAKE, OREG.

LOCATION.—In sec. 24, T. 40 S., R. 23 E., about one-fourth mile above highway bridge at mouth of canyon, 2 miles south of Warner Lake post office, Lake County; below all tributaries.

Drainage area.—155 square miles (measured on map issued by United States Reclamation Service). Total drainage area, 218 square miles, but an area of 58 square miles, tributary to Cowhead Lake, contributed no water to Twentymile Creek from about June 1, 1911, until the spring of 1914, and probably very little in 1914.

Records available.—March 1, 1910, to September 30, 1915.

Gage.—Barrett & Lawrence water-stage recorder on right bank, December 3, 1914, to September 30, 1915; read weekly prior to this date by F. B. Houston. Original gage, at the bridge March 1, 1910, was removed to the present site on June 3, 1910; gage readings during 1910 and 1911 at the present site were referred to the same datum. Readings for 1912–1914 are referred to a datum 0.32 foot lower than that used during 1911. The water-stage recorder, temporarily installed, was used March 31 to July 20, 1914.

Discharge measurements.—Made from highway bridge or by wading.

Channel and control.—Bed composed of boulders and gravel; probably shifts slightly. Control is a solid rock reef, broken by crevices; obstructions on the control change the stage-discharge relation occasionally. Banks not subject to overflow. Stage of zero flow about —0.2 foot gage height.

Extremes of discharge.—Maximum stage recorded during year, 6.1 feet at 7 p. m. May 10 (discharge, 1,020 second-feet); minimum stage, 0.26 foot August 30 and September 1 (discharge, 1.8 second-feet).

1910–1915: Maximum stage recorded, 4.8 feet at original gage at bridge March 1, 1910 (discharge, 2,610 second-feet). The crest of the 1910 flood may have been even higher; minimum stage occurred in 1915.

Winter flow.—Stage-discharge relation not seriously affected by ice; ice forms in the stream but seldom at control; open-channel rating curve assumed applicable.

Diversions.—Some bottom land is irrigated along Fifteenmile and Twelvemile Creeks and along Eightmile Creek, a tributary of Cowhead Lake. Two small ditches take out just above station. A ditch also diverts from the head of Twelvemile Creek into Lake Anne, a small storage reservoir in the north end of Surprise Valley.

Regulation.—None.

Accuracy.—Records excellent for period during which water-stage recorder was in operation; only fair during other periods on account of diurnal fluctuation at high stages and lack of daily readings at low stages.

Discharge measurements of Twentymile Creek near Warner Lake, Oreg., during the year ending Sept. 30, 1915.

[Made by P. V. Hodges.]

Date.	Gage height.	Discharge.	Date.	Gage height.	Discharge.
	Feet.	*Sec.-ft.*		*Feet.*	*Sec.-ft.*
Mar. 20	2.21	72	Apr. 15	1.50	27
Apr. 3	2.66	141	May 11	4.54	518
6	1.70	23.7			

Daily discharge, in second-feet, of Twentymile Creek near Warner Lake, Oreg., for the year ending Sept. 30, 1915.

Day.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.
1	3.5	5.3	6.6	6.1	8.4	7.7	112	48	79	11	3.6	1.8
2	3.6	5.3	6.9	6.3	9.4	7.6	113	110	73	10	3.0	1.9
3	3.7	5.3	7.2	6.6	8.0	7.5	159	153	67	10	2.9	2.0
4	3.7	5.3	7.2	6.8	7.8	7.3	62	72	62	9	2.8	2.0
5	3.8	5.3	7.2	7.0	7.5	7.2	46	44	62	9	2.7	2.1
6	3.9	5.3	7.1	7.3	7.3	7.1	37	38	62	10	2.6	2.2
7	3.9	5.3	7.0	7.5	7.0	7.0	34	38	62	15	2.5	2.3
8	4.0	5.3	6.8	7.8	6.8	6.8	32	40	62	8.7	2.5	2.4
9	4.1	5.3	6.7	8.0	7.2	10	28	61	62	8.2	2.4	2.4
10	4.2	5.3	6.6	8.9	6.6	13	28	421	48	7.7	2.3	2.5
11	4.3	5.3	6.5	6.5	6.5	17	30	354	44	7.1	2.3	2.6
12	4.4	5.3	6.1	5.2	8.7	20	32	242	44	6.6	2.2	2.6
13	4.5	5.3	6.0	6.5	10	24	30	112	36	6.1	2.1	2.7
14	4.6	5.3	5.8	5.2	13	28	26	78	33	5.6	2.1	2.7
15	4.7	5.3	5.7	5.8	15	32	27	67	30	5.1	2.0	2.7
16	4.8	6.0	5.5	5.2	14	42	28	67	28	4.5	2.0	2.8
17	4.9	5.2	5.4	5.2	13	53	32	72	28	4.0	2.0	2.8
18	5.0	4.3	5.2	5.2	11	63	33	72	28	3.5	2.0	2.8
19	5.1	3.5	5.2	5.2	10	74	34	67	28	3.5	2.0	2.9
20	5.2	2.6	5.2	7.2	8.9	84	38	62	24	3.5	1.9	2.9
21	5.3	3.0	5.2	7.8	7.7	100	43	62	22	3.5	1.9	2.9
22	5.3	3.3	5.3	8.4	6.5	200	42	62	21	3.5	1.9	3.0
23	5.3	3.7	5.6	8.4	6.7	300	38	57	20	3.5	1.9	3.1
24	5.3	4.0	5.8	8.4	6.9	228	41	57	18	3.0	1.9	3.1
25	5.3	4.4	5.8	8.4	7.0	190	40	52	17	3.0	1.9	3.2
26	5.3	4.7	5.8	8.4	7.2	126	40	62	16	3.0	1.9	3.2
27	5.3	5.1	5.8	8.4	7.4	112	40	72	15	3.0	1.9	3.3
28	5.3	5.5	5.5	8.4	7.5	324	40	84	14	3.0	1.9	3.3
29	5.3	5.8	5.5	8.4	....	152	100	84	13	3.0	1.9	3.4
30	5.3	6.2	5.5	8.4	....	78	120	84	12	4.0	1.8	3.4
31	5.3	....	5.5	8.4	....	133	....	84	....	4.2	1.8	....

NOTE.—Discharge determined from rating curve well defined above 3 second-feet. Discharge interpolated for following periods: Oct. 1-8, 10-12, 14-20, 22-27, Oct. 29 to Nov. 3, Nov. 5-14, 17-19, Nov. 21 to Dec. 2, Dec. 6-10, 13-17, Jan. 2-8, 23-31, Feb. 4-7, 12-14, 16-21, 23-28, Mar. 2-7, 9-14, 16-19, 21-22, June 1-2, 29-30, July 9-17, 19-22, Aug. 14-20, Sept. 2-10, 12-21, and 23-30. Discharge has been determined from 6 readings taken daily from recorder graph for Mar. 24-25, 28-29, Apr. 2-3, May 2-3, 9-12. Discharge ascertained, by comparison with records for Deep Creek, Jan. 16-19, Apr. 25-30, and July 2-7,

Monthly discharge of Twentymile Creek near Warner Lake, Oreg., for the year ending Sept. 30, 1915.

Month.	Discharge in second-feet.			Run-off (total in acre-feet).	Accuracy.
	Maximum.	Minimum.	Mean.		
October	5.3	3.5	4.65	286	C.
November	6.2	2.6	4.89	291	C.
December	7.2	5.2	6.04	371	B.
January	8.9	5.2	7.14	439	B.
February	15	6.5	8.68	482	B.
March	324	6.8	79.4	4,880	B.
April	159	26	50.2	2,990	B.
May	421	38	96.1	5,910	A.
June	79	12	37.7	2,240	A.
July	15	3.0	5.96	366	B.
August	3.6	1.8	2.21	136	B.
September	3.4	1.8	2.70	161	B.
The year	421	1.8	25.6	18,600	

DEEP CREEK AT BIG VALLEY, NEAR LAKEVIEW, OREG.

Location.—In sec. 4, T. 40 S., R. 22 E., near the dam site for the proposed Big Valley reservoir, 8 miles above mouth of Camas Creek, about 9 miles from Mud Creek stage station, and 12 miles east of Lakeview, Lake County.

Drainage area.—76 square miles (measured on map issued by United States Reclamation Service).

Records available.—May 3, 1911, to September 30, 1915. Station discontinued September 30, 1915.

Gage.—Stevens water-stage recorder on right bank from March 26, 1914, to September 30, 1915; Barrett & Lawrence recorder used December, 1911, to March 25, 1914. Original staff gage, about one-fourth mile below recorder, was used until December, 1911, and as a reference gage for the recorder until May 28, 1912. May 28 to August 21, 1912, a staff gage at cable was used as a reference gage. Gage heights for 1912 previous to August 22 were referred to the cable gage by means of comparative readings. Since August 22, 1912, a staff gage on the stilling well of the water-stage recorder has been used as a reference gage.

Discharge measurements.—Made from cable about 100 feet below gage or by wading.

Channel and control.—Bed composed of gravel and sand; control rock and firm gravel; practically permanent. Banks subject to overflow at high stages for a short distance each side of the main channel.

Extremes of discharge.—Maximum stage during year from water-stage recorder, 3.78 feet at 2 p. m. May 10 (discharge, 355 second-feet); minimum stage, 0.30 foot August 27 and 30 (discharge, 2.5 second-feet).

1911–1915: Maximum stage recorded, 5.27 feet for cable gage at 12 p. m. May 29, 1912 (discharge, 790 second-feet); minimum stage, 0.30 foot August 27 and 30, 1915 (discharge, 2.5 second-feet).

Winter flow.—Stream freezes over at gage, but probably not at control; stage-discharge relation practically unaffected by ice.

Diversions.—A large area of wild hay land (perhaps 2,000 acres) is irrigated in Big Valley above station by natural flooding in the spring and from ditches during summer.

Regulation.—None.

Accuracy.—Records good except when recording gage was not working properly. Discharge estimated for periods when gage was not working. Total yearly run-off is practically correct.

Discharge measurements of Deep Creek at Big Valley, near Lakeview, Oreg., during the year endnig Sept. 30, 1915.

Date.	Made by—	Gage height.	Discharge.	Date.	Made by—	Gage height.	Discharge.
		Feet.	*Sec.-ft.*			*Feet.*	*Sec.-ft.*
Nov. 17	J. E. Stewart	0.64	11.1	Apr. 11	P. V. Hodges	1.96	98
Dec. 6	do	[a].50	6.3	21	do	2.60	164
Mar. 28	P. V. Hodges	2.30	126	May 10	do	3.78	357

[a] Stage-discharge relation may have been affected by ice.

Daily discharge, in second-feet, of Deep Creek at Big Valley, near Lakeview, Oreg., for the year ending Sept. 30, 1915.

Day.	Oct.	Nov.	Dec.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.
1	6.3				99	203	234	19	11	3.0
2	6.9				137	180	216	18	9.6	3.1
3	12				224	175	190	17	8.4	
4	9.6				135	161	179	18	7.2	
5	9.0				100	147	170	19	6.5	
6	9.3		6.0		85	133	167	23	6.5	
7	9.3				90	120	166	28	6.0	
8	9.6				80	106	161	25	6.0	
9	9.3				80	106	150	24	5.5	
10	14				95	297	132	22	5.5	
11	17				104	280	127	20	5.0	
12	15				113	250	124	17	5.0	
13	14				107	206	106	16	5.0	
14	14				90	209	91	15	4.5	
15	14				97	188	80	15	4.5	
16	12	6.0			110	180	72	14	4.0	
17	12	6.0		15	126	196	68	14	4.0	
18		5.2		25	134	240	68	13	4.0	
19		6.0		50	141	216	67	12	4.0	
20		6.6		60	152	182	62	11	4.0	
21		6.9		80	163	213	58	10	3.8	
22		7.8		90	147	210	54	8.8	3.8	
23		8.1		100	130	195	50	7.7	3.7	
24		10		110	151	204	46	6.6	3.4	
25		7.5		100	128	184	42	5.6	3.1	
26		10		92	128	184	38	3.6	2.8	
27				76	140	199	34	3.6	2.5	
28				141	157	230	30	4.0	2.6	
29				107	223	241	28	4.2	2.8	
30				79	217	234	23	9.6	2.5	
31				80		234		16	2.8	

NOTE.—Discharge determined from rating curve fairly well defined from 100 to 400 second-feet; Mar. 17–25, by comparison with Adel record; May 8 and 9, estimated as for a gage height of 2.1 feet, the lowest point shown by the recorder for the period Apr. 30 to May 9, during which time the clock was stopped; Apr. 30 to May 7, June 21–27, July 18–24, and Aug. 5–18, interpolated. Mean discharge Oct. 18–31 estimated 10 second-feet; Nov. 1–15 and 27–30, 8 second-feet; Dec. 1–31, 6 second-feet; Jan. 1 to Feb. 28, 8 second-feet; Mar. 1–16, 10 second-feet; Sept. 1–30, 3.3 second-feet.

Monthly discharge of Deep Creek at Big Valley, near Lakeview, Oreg., for the year ending Sept. 30, 1915.

Month.	Discharge in second-feet.			Run-off (total in acre-feet).	Accuracy.
	Maximum.	Minimum.	Mean.		
October			10.7	658	C.
November			7.74	461	C.
December			[a] 6.0	369	D.
January			[a] 8.0	492	D.
February			[a] 8.0	444	D.
March	141		44.0	2,710	C.
April	224	80	129	7,680	A.
May	297	106	197	12,100	B.
June	234	23	101	6,010	B.
July	28	3.6	14.2	873	C.
August	11	2.5	4.84	298	C.
September			[a] 3.3	196	D.
The year	297	2.5	44.7	32,300	

[a] Estimated.

DEEP CREEK AT ADEL, OREG.

LOCATION.—In the SE. ¼ sec. 21, T. 39 S., R. 24 E., just back of Wible's Hotel at Adel, Lake County, about one-eighth mile upstream from wagon bridge crossing creek; below all tributaries.

DRAINAGE AREA.—250 square miles (measured on map issued by United States Reclamation Service; revised since publication of Water-Supply Paper 390).

RECORDS AVAILABLE.—May 11, 1909, to September 30, 1915.

GAGE.—Barrett & Lawrence water-stage recorder June 20 to September 30, 1914, and March 19 to May 27, 1915; Friez recorder used March 10 to June 19, 1914; recorders refer to vertical staff in two sections on left bank above a series of rapids; datum unchanged since 1913; daily readings on staff gage at other times by M. Wible. From 1909 to 1912 the gage apparently rose gradually 0.11 foot and was not corrected.

DISCHARGE MEASUREMENTS.—Made from wagon bridge or by wading.

CHANNEL AND CONTROL.—Bed composed of gravel and boulders; probably permanent except for slight shifts affecting only low water. Banks subject to overflow during extreme floods. Gage height of zero flow about 2.0 feet.

EXTREMES OF DISCHARGE.—Maximum stage during the year from water-stage recorder, 4.7 feet at 2 p. m. April 3 (discharge, 552 second-feet); minimum stage, 2.35 feet August 19–21 (discharge, 2.0 second-feet).

1909–1915: Maximum stage recorded, 9.0 feet at 6 p. m. March 2, 1910 (discharge, 4,950 second-feet); minimum stage, 2.35 feet August 19–21, 1915 (discharge, 2.0 second-feet).

WINTER FLOW.—Stage-discharge relation affected occasionally by backwater from ice jams; control generally remains open.

DIVERSIONS.—Several small ditches divert water for irrigation near headwaters of stream, and 2,000 or 3,000 acres of land are watered by natural flooding near Big Valley and Crane Lake, but much of the water is probably returned to stream. The most important diversions are those made within 2 miles above gage, near the mouth of the Deep Creek canyon, by five ditches having a total capacity of about 30 second-feet. The M. C. ditch (capacity, about 200 second-feet) takes out one-eighth mile below gage. Gages were installed and read on the Company and M. C.-Givan ditches during part of the irrigation season of 1915. Occasional measurements were made of the others (see p. 199), and an estimate prepared of their discharge.

REGULATION.—None.

ACCURACY.—Rating curve well defined. Records good during time when recording gage was running; poor at other times.

Discharge measurements of Deep Creek at Adel, Oreg., during the year ending Sept. 30, 1915.

Date.	Made by—	Gage height.	Discharge.	Date.	Made by—	Gage height.	Discharge.
		Feet.	*Sec.-ft.*			*Feet.*	*Sec.-ft.*
Nov. 11	J. E. Stewart..........	2.82	19.2	Mar. 29	P. V. Hodges..........	4.15	326
Mar. 19	P. V. Hodges..........	3.30	84.0	Apr. 19	....do..................	4.00	283

Daily discharge, in second-feet, of Deep Creek at Adel, Oreg., for the year ending Sept. 30, 1915.

Day.	Oct.	Nov.	Dec.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.
1	11	22	17	18	25	205	227	330	24	7
2	11	22	16	18	22	259	211	320	24	7
3	22	22	18	22	22	435	255	300	24	7
4	18	22	16	18	22	377	283	275	28	7
5	11	22	18	18	22	269	191	250	32	7
6	9	22	....	22	25	211	172	225	36	7
7	9	22	....	22	25	211	158	210	40	7
8	10	19	....	25	25	197	153	191	44	7
9	10	18	....	22	25	177	177	153	36	5.5
10	9	24	....	18	25	197	377	148	36	2.5
11	11	16	....	18	25	219	461	140	36	2.5
12	11	22	....	22	25	249	470	135	30	2.5
13	10	22	....	18	25	233	377	125	24	2.5
14	11	22	....	22	25	191	337	120	16	2.5
15	11	25	....	22	25	194	326	115	7	2.5
16	13	22	....	22	25	219	283	105	7	2.5
17	13	18	....	18	25	233	272	100	7	2.5
18	18	19	....	18	25	246	337	95	7	2.5
19	30	16	....	18	108	265	365	85	7	2.0
20	51	18	....	22	134	265	297	80	7	2.0
21	30	22	....	22	172	265	301	75	7	2.0
22	22	16	....	22	239	233	294	65	7	....
23	22	18	....	22	319	208	265	60	7	....
24	22	18	....	25	357	227	259	55	7	....
25	22	18	....	25	290	219	265	50	7	....
26	22	22	....	25	205	194	272	45	7	....
27	22	18	....	25	205	191	272	40	7	....
28	22	18	....	25	301	202	330	35	7	....
29	22	13	....	....	319	233	340	30	7	....
30	25	22	....	....	219	283	350	27	7	....
31	30	....	....	....	191	....	340	....	7	....

NOTE.—Discharge, Oct. 1 to Apr. 1, determined from rating curve well defined above 12 second-feet; Apr. 2 to Aug. 21, from rating curve well defined above 6 second-feet; curves are the same above 30 second-feet. Discharge estimated Mar. 27-28, May 28 to June 7, June 11-30; interpolated July 4-7. Gage-height record poor and discharge uncertain except during the period Mar. 19 to May 27, when recorder was working. Mean discharge Aug. 22-31 estimated 2.0 second-feet.

Monthly discharge of Deep Creek at Adel, Oreg., for the year ending Sept. 30, 1915.

Month.	Discharge in second-feet.			Run-off (total in acre-feet).	Accuracy.
	Maximum.	Minimum.	Mean.		
October	51	9	18.1	1,110	B.
November	25	13	20.0	1,190	B.
December	....	....	[a] 20.0	1,230	D.
January	....	....	[a] 25.0	1,540	D.
February	25	18	21.2	1,180	D.
March	357	22	113	6,950	B.
April	435	177	237	14,100	A.
May	470	153	289	17,800	B.
June	[a] 330	27	133	7,910	D.
July	44	7	17.7	1,090	D.
August	7	2.0	3.55	218	D.
September	....	....	[a] 5.0	298	D.
The year	470	2.0	75.4	54,600	

[a] Estimated.

Monthly discharge of ditches diverting water from Deep Creek above Adel, Oreg., for the period April to September, 1915.

Month.	Discharge in second-feet.					Total.	
	Crump.	M. C.—Givan.	Wible Messner.	Company.	Wible.	Second-feet.	Acre-feet.
April	[a] 0.5	0.6	[a] 3.0	2.36	0.0	6.46	384
May	[a] 1.0	3.51	[a] 8.0	12.4	[a] 1.0	25.9	1,590
June	[a] 1.0	4.46	[a] 6.0	14.5	[a] 1.0	27.0	1,610
July	[a] 1.0	3.77	[a] 4.0	2.58	[a] 1.0	12.4	762
August	[a] 1.0	[a] 2.0	[a] 3.0	[a] 1.0	[a] 1.0	8.0	492
September	[a] .5	[a] 2.0	[a] 2.0	[a] 1.0	.0	5.5	327
The period						14.2	5,170

[a] Estimated.

Monthly discharge of M. C. ditch diverting water from Deep Creek below Adel, Oreg., for the period April to September, 1915.

	Apr.	May.	June.	July.	Aug.	Sept.	Period.
Mean (second-feet)	35.6	87.6	27.3	16.6	2.1	[a] 3.0	28.7
Total (acre-feet)	2,120	5,390	1,620	1,020	129	178	10,500

[a] Estimated.

CAMAS CREEK NEAR LAKEVIEW, OREG.

LOCATION.—In the NE. ¼ sec. 3, T. 39 S., R. 22 E., 500 feet below mouth of Blue Creek, and about 20 miles from Lakeview, Lake County.

DRAINAGE AREA.—63 square miles (measured on map issued by United States Reclamation Service; revised since publication of Water-Supply Paper 390).

RECORDS AVAILABLE.—September 11, 1912, to November 19, 1914; occasional readings March 18 to May 9, 1915, when station was discontinued.

GAGE.—Vertical staff on right bank, read once a day. Stevens water-stage recorder used March 27 to November 19, 1914.

DISCHARGE MEASUREMENTS.—Made from foot log or by wading.

CHANNEL AND CONTROL.—Bed composed of gravel and boulders; fairly permanent. Point of zero flow, about —0.2 foot gage height.

EXTREMES OF DISCHARGE.—Maximum stage recorded during year, 3.7 feet at 2.30 p. m. April 29 and 10.30 a. m. April 30 (discharge, 365 second-feet); the stage may have gone higher during the night, or during the high water of May 10–11. No record of minimum.

1913–1915: Maximum stage recorded, 4.47 feet at 8 a. m. April 10, 1914 (discharge, 454 second-feet); minimum stage, 0.40 foot September 17–23, 1913 (discharge, 2 second feet).

WINTER FLOW.—Stage-discharge relation seriously affected by ice; records discontinued.

DIVERSIONS.—A little irrigation is practiced in Camas Prairie, near head of stream.

REGULATION.—None.

ACCURACY.—Determinations of daily discharge for 1915 fair; monthly discharge not computed.

Discharge measurements of Camas Creek near Lakeview, Oreg., during the year ending Sept. 30, 1915.

Date.	Made by—	Gage height.	Discharge.	Date.	Made by—	Gage height.	Discharge.
		Feet.	*Sec.-ft.*			*Feet.*	*Sec.-ft.*
Nov. 19	J. E. Stewart	0.65	9.6	Apr. 12	P. V. Hodges	2.51	138
Mar. 18	P. V. Hodges	1.19	27.6	20	.....do	2.22	108
26	.....do	2.00	87.1	May 9	.....do	1.70	61.1
Apr. 10	.....do	2.30	111	Oct. 10	Henshaw and Batchelder	.41	3.8

Daily discharge, in second-feet, of Camas Creek near Lakeview, Oreg., for the year ending Sept. 30, 1915.

Day.	Oct.	Nov.	Mar.	Apr.	May.	Day.	Oct.	Nov.	Mar.	Apr.	May.
1	7.6	12		139	107	16	13				
2	12	11		149		17	22				
3	9.6	11		272	87	18	24	8	28		
4	8.6				77	19	18	9	39		
5	8.8				68	20	14		51	117	
6	8.8				51	21	13			107	
7	8.6				51	22	12		77	87	
8	9.6				45	23	11		97		
9	14				50	24	11		127		
10	12			127		25	11		117		
11	11			137		26	10		89		
12	9.6			137		27	11		79	107	
13	9.2					28				107	
14	8.4					29	12		129	264	
15	9.0					30	14		119	280	
						31	12		119		

NOTE.—Discharge determined from a fairly well defined rating curve; published only for days when gage heights are available.

MUD CREEK NEAR PLUSH, OREG.

LOCATION.—In sec. 32, T. 38 S., R. 22 E., just above road between Lakeview and Plush, about half a mile above junction of Mud and Camas creeks, and 22 miles from Plush, Lake County.

DRAINAGE AREA.—Not measured.

RECORDS AVAILABLE.—April 25, 1911, to August 31, 1912; March 27 to May 9, 1915, when station was discontinued.

GAGE.—Vertical staff on left bank 300 feet above highway bridge; read twice daily by Francis Anderson.

DISCHARGE MEASUREMENTS.—Made from bridge or by wading.

CHANNEL AND CONTROL.—Bed composed of boulders and gravel; slightly shifting.

EXTREMES OF DISCHARGE.—Maximum stage recorded during year, 2.35 feet during night of April 11, observed from high-water marks the next morning (discharge, 108 second-feet).

1911–12 and 1915: Maximum stage recorded, 3.9 feet May 21, 1912 (discharge, 303 second-feet); minimum discharge, 2.8 second-feet, obtained from current-meter measurement October 10, 1915.

WINTER FLOW.—Stage-discharge relation may be affected by ice; open-water rating is applicable to all records which have been obtained.

DIVERSION.—None.

REGULATION.—None.

ACCURACY.—Records good.

Discharge measurements of Mud Creek near Plush, Oreg., during the year ending Sept. 30, 1914.

[Made by J. E. Stewart.]

Date.	Gage height.	Discharge.	Date.	Gage height.	Discharge.
	Feet.	*Sec.-ft.*		*Feet.*	*Sec.-ft.*
Apr. 14	2.58	122	July 13	0.88	6.4
14	2.88	183			

Discharge measurements of Mud Creek near Plush, Oreg., during the year ending Sept. 30, 1915.

Date.	Made by—	Gage height.	Discharge.	Date.	Made by—	Gage height.	Discharge.
		Feet.	*Sec.-ft.*			*Feet.*	*Sec.-ft.*
Mar. 27	P. V. Hodges	0.90	7.6	Apr. 20	P. V. Hodges	1.92	66
Apr. 10	do	1.85	58	May 9	do	1.58	40.2
11	do	2.15	81	Oct. 10	Henshaw and Batchelder.	.72	2.8
12	do	1.80	59				

Daily discharge, in second-feet, of Mud Creek near Plush, Oreg., for the year ending Sept. 30, 1915.

Day.	Mar.	Apr.	May.	Day.	Mar.	Apr.	May.	Day.	Mar.	Apr.	May.
1		10	38	11		75		21		51	
2		9.4	36	12		82		22		42	
3		15	35	13		65		23		35	
4		29	43	14		65		24		40	
5		41	41	15		69		25		26	
6		32	38	16		61		26		32	
7		35	35	17		57		27	9.4	34	
8		33	35	18		49		28	14	36	
9		34	49	19		48		29	12	38	
10		60		20		57		30	11	40	
								31	11		

NOTE.—Discharge determined from well-defined rating curve. Discharge estimated Apr. 24–25, Apr. 28 to May 1, and May 6–8. Total run-off Mar. 27–31, 114 acre-feet; Apr. 1–30, 2,580 acre-feet; May 1–9, 604 acre-feet; for the period Mar. 27 to May 9, 3,300 acre-feet.

DRAKE CREEK NEAR ADEL, OREG.

Location.—In sec. 9, T. 39 S., R. 23 E. (unsurveyed), at highway bridge, 1 mile above mouth, 8 miles west of Adel, Lake County.

Drainage area.—Not measured.

Records available.—Occasional readings March 18 to May 10, 1915, when station was discontinued.

Gage.—Vertical staff on left abutment of highway bridge.

Discharge measurements.—Made by wading.

Channel and control.—Bed composed of gravel; control rocky; probably permanent. Left bank low, and some water may pass around bridge during floods. The point of zero flow is at zero height.

Extremes of discharge.—Maximum stage recorded during year, 1.54 feet; during flood of March 24–26, determined by leveling to high-water mark (discharge, 137 second-feet); minimum stage, 0.45 foot (discharge, 4.2 second-feet) by current-meter measurement of October 10.

Winter flow.—No records.

Diversion.—None.

ACCURACY.—Records good for days when gage was read, but on account of diurnal fluctuation may not represent mean daily discharge correctly. Monthly means have not been computed.

Discharge measurements of Drake Creek near Adel, Oreg., during the period Mar. 18 to Oct. 10, 1915.

Date.	Made by—	Gage height.	Discharge.	Date.	Made by—	Gage height.	Discharge.
		Feet.	*Sec.-ft.*			*Feet.*	*Sec.-ft.*
Mar. 18	P. V. Hodges	0.87	30.6	Apr. 10	P. V. Hodges	0.48	5.8
26	do	.70	18.4	20	do	.47	5.2
28	do	1.44	116	Oct. 10	Henshaw and Batchelder	.45	4.2

Daily discharge, in second-feet, of Drake Creek near Adel, Oreg., for the year ending Sept. 30, 1915.

Date.	Discharge.	Date.	Discharge.	Date.	Discharge.
	Sec.-ft.		*Sec.-ft.*		*Sec.-ft.*
Mar. 18	31	Mar. 30	18	Apr. 28	55
20	19	31	34	29	55
22	62	Apr. 1	24	30	34
23	45	2	34	May 3	18
24	41	3	87		
				4	12
25	50	10	5	5	12
26	30	19	6	6	6
27	15	20	5	10	12
28	116	27	55		
29	30				

NOTE.—Discharge determined from a well defined rating curve.

M. C.-GIVAN DITCH NEAR ADEL, OREG.

LOCATION.—In sec. 20, T. 39 S., R. 24 E., near intake, about a mile above Adel, Lake County.

RECORDS AVAILABLE.—April 7 to September 30, 1915; some measurements 1911–1914.

GAGE.—Vertical staff; read by Myrtle Wible and J. N. Givan.

DISCHARGE MEASUREMENTS.—Made by wading near gage.

CHANNEL AND CONTROL.—Bed composed of gravel; somewhat shifting.

EXTREMES OF DISCHARGE.—Maximum stage recorded during year, 5.5 feet June 19 (discharge, 7.8 second-feet); minimum discharge, canal dry at times.

ACCURACY.—Records roughly approximate.

This ditch diverts water from right bank of Deep Creek in the N. W. ¼ sec. 20, for irrigating land south of that stream near Adel. Most of the water returned to the creek enters below station at Adel.

Discharge measurements of M. C.-Givan ditch near Adel, Oreg., for the period Apr. 19 to Oct. 6, 1915.

Date.	Made by—	Gage height.	Discharge.	Date.	Made by—	Gage height.	Discharge.
		Feet.	*Sec.-ft.*			*Feet.*	*Sec.-ft.*
Apr. 9	P. V. Hodges	4.60	0.4	May 5	P. V. Hodges	4.91	1.5
14	do	4.60	.3	12	do	5.15	3.7
19	do	4.75	1.2	Oct. 6	F. F. Henshaw	5.22	3.4

Daily discharge, in second-feet, of M. C.-Givan ditch near Adel, Oreg., for the year ending Sept. 30, 1915.

Day.	Apr.	May.	June.	July.	Day.	Apr.	May.	June.	July.
1		1.5	3.2	5.3	16	0.6	2.9	5.1	4.5
2		1.5	3.2	5.2	17	.7	3.5	6.0	4.5
3		1.6	3.2	5.2	18	.8	4.2	6.9	4.4
4		1.6	3.2	5.1	19	.9	4.8	7.8	4.4
5		1.6	3.2	5.1	20	.9	5.4	7.5	4.3
6		1.9	3.0	5.0	21	.9	6.0	7.1	4.3
7	0.4	2.2	2.7	5.0	22	1.0	6.6	6.8	4.3
8	.4	2.6	2.5	4.9	23	1.0	6.1	6.4	3.8
9	.4	2.9	2.2	4.9	24	1.1	5.6	6.1	3.2
10	.4	3.2	2.0	4.8	25	1.1	5.2	5.7	1.8
11	.4	3.5	1.7	4.8	26	1.2	4.7	5.4	.3
12	.3	3.8	1.5	4.7	27	1.2	4.2	5.4	.3
13	.3	3.3	2.4	4.7	28	1.3	3.7	5.4	.3
14	.3	2.8	3.3	4.6	29	1.3	3.2	5.3	.3
15	.4	2.3	4.2	4.6	30	1.4	3.2	5.3	.9
					31		3.2		1.5

NOTE.—Discharge May to July determined from a fairly well defined rating curve. Gage read Apr. 9, 14, 19, May 5, 12, 15, 22, 29, June 5, 12, 19, 26, July 22, 24, 26, 29, 31; discharge interpolated for days when gage was not read. Water turned into canal at 8 a. m Apr. 7.

Monthly discharge of M. C.-Givan ditch near Adel, Oreg., for the year ending Sept. 30, 1915.

Month.	Discharge in second-feet.			Run-off (total in acre-feet).	Accuracy.
	Maximum.	Minimum.	Mean.		
April 7–30	1.4	3	0.78	37	D.
May	6.6	1.5	3.51	216	C.
June	7.8	1.5	4.46	265	C.
July	5.3	.3	3.77	232	D.
August			[a]2.0	123	D.
September			[a]2.0	119	D.
The period				992	

[a] Estimated.

COMPANY DITCH NEAR ADEL, OREG.

LOCATION.—In the NE. ¼ sec. 20, T. 39 S., R. 24 E., about half a mile below intake, and a mile above Adel, Lake County.

RECORDS AVAILABLE.—April 8 to September 30, 1915; some measurements 1911–1914.

GAGE.—Vertical staff, about 100 feet below flume crossing Deep Creek; read by J. E. Lemberger.

DISCHARGE MEASUREMENTS.—Made by wading near gage.

CHANNEL AND CONTROL.—Bed composed of gravel; somewhat shifting.

EXTREMES OF DISCHARGE.—Maximum stage recorded during year, 5.95 feet June 22 and 26 (discharge, 18 second-feet); minimum discharge, canal dry at times.

ACCURACY.—Results good for May and June; roughly approximate for April and July.

This ditch diverts water in the NW. ¼ sec. 20, from the right bank of Deep Creek; it crosses the creek about one-fourth mile below the intake and irrigates land lying north of creek near Adel. Return water enters creek for the most part below station at Adel.

Discharge measurements of Company ditch near Adel, Oreg., during the period Apr. 9 to Oct. 6, 1915.

Date.	Made by—	Gage height.	Discharge.	Date.	Made by—	Gage height.	Discharge.
		Feet.	*Sec.-ft.*			*Feet.*	*Sec.-ft.*
Apr. 9	P. V. Hodges	4.84	2.0	May 12	P. V. Hodges	5.60	11.2
14	do	4.85	2.1	Oct. 6	F. F. Henshaw	4.75	.9
May 5	do	5.50	9.2				

Daily discharge, in second-feet, of Company ditch near Adel, Oreg., for year ending Sept. 30, 1915.

Day.	Apr.	May.	June.	July.	Day.	Apr.	May.	June.	July.
1		8	14	15	16	2.2	15	16	
2		8	13	13	17	2.2	16	16	
3		9	13	11	18	0	16	16	
4		9	12	10	19	0	14	14	
5		9.3	14	8	20	0	11	12	
6		11	16	6	21	3	11	13	
7		12	15	4	22	3	11	16	
8	1.4	14	14	4	23	4	10	18	
9	2.1	16	12	3	24	4	11	18	
10	2.1	14	11	2	25	5	14	18	
11	2.1	11	10	2	26	5	15	18	
12	2.2	11	12	1	27	6	15	17	
13	2.2	11	13	1	28	6	15	17	
14	2.2	10	11	0	29	7	15	17	
15	2.2	11	11		30	7	16	17	
					31		15		

NOTE.—Discharge determined from a well-defined rating curve. Gage read about every other day May 10 to June 30; discharge for April and July estimated; discharge interpolated on days when gage was not read. Water turned into canal 8 a. m. Apr. 8.

Monthly discharge of Company ditch near Adel, Oreg., for the year ending Sept. 30, 1915.

Month.	Discharge in second-feet.			Run-off (total in acre-feet).	Accuracy.
	Maximum.	Minimum.	Mean.		
April 8-30	7	0	3.08	140	D.
May	16	8	12.4	762	B.
June	18	10	14.5	863	B.
July	15	0	[a] 2.58	159	D.
August			[a] 1.0	61	D.
September			[a] 1.0	60	D.
The period				2,050	

[a] Estimated.

M. C. DITCH AT ADEL, OREG.

LOCATION.—In sec. 21, T. 39 S, R. 24 E., about one-eighth mile below intake and the same distance from highway bridge at Adel, Lake County.

RECORDS AVAILABLE.—April 16 to September 30, 1915.

GAGE.—Vertical staff on right or upper bank of ditch; read about once a week by J. N. Givan.

DISCHARGE MEASUREMENTS.—Made from foot plank or by wading.

CHANNEL AND CONTROL.—Bed composed of gravel; shifts slightly.

EXTREMES OF DISCHARGE.—Maximum stage recorded during year, 8.78 feet at 7.15 p. m. May 11 (discharge, 202 second-feet).

This canal diverts water from right bank of Deep Creek just below highway bridge at Adel, for irrigating land lying on the south side of Deep Creek.

Discharge measurements of M. C. ditch at Adel, Oreg., during the period Apr. 19 to Oct. 6, 1915.

Date.	Made by—	Gage height.	Discharge.	Date.	Made by—	Gage height.	Discharge.
		Feet.	*Sec.-ft.*			*Feet.*	*Sec.-ft.*
Apr. 19	P. V. Hodges	2.70	64	Oct. 6	F. F. Henshaw	1.40	3.8
26	do	3.02	98				

Daily discharge, in second-feet, of M. C. ditch at Adel, Oreg., for the year ending Sept. 30, 1915.

Day.	Apr.	May.	June.	July.	Aug.	Day.	Apr.	May.	June.	July.	Aug.
1		80	44		4	16	30	89	34		
2		77	37		3	17	44	88	39		
3		75	30		3	18	44	87	43		
4		72	23		2	19	58	87	48		
5		69	16		2	20	69	86	44		
6		70	16		2	21	70	85	41		
7		70	16		2	22	70	84	37	13	
8		70	16		2	23	70	81	34	13	
9		70	16		2	24	70	78	30	13	
10		130	16		2	25	102	76	27	13	
11		198	16		2	26	94	73	23	13	
12		169	16		2	27	91	70		10	
13		142	21		2	28	88	67		6	
14		116	26		2	29	86	64		5	
15		90	30		2	30	83	57		5	
						31		50		4	

Note.—Discharge determined from a well-defined rating curve. Gage read Apr. 18–20, 25–26, May 5, 1, 12, 15, 22, 29, June 5, 12, 19, 25, July 22, 26, 28, 31, Aug. 1, 4, 7, 9–11, 13, 15. Discharge for other days interpolated or estimated. Mean discharge June 27 to July 21, estimated, 20 second-feet; Aug. 16–31, 2 second-feet. Water turned into ditch Apr. 16.

Monthly discharge of M. C. ditch at Adel, Oreg., for the year ending Sept. 30, 1915.

Month.	Discharge in second-feet.			Run-off (total in acre-feet).	Accuracy.
	Maximum.	Minimum.	Mean.		
April 16–30	102	30	71.3	2,120	B.
May	198	50	87.6	5,390	B.
June	48	16	27.3	1,620	C.
July		4	16.6	1,020	D.
August			2.1	129	D.
September			[a] 3.0	179	D.
The period				10,500	

[a] Estimated.

HONEY CREEK NEAR PLUSH, OREG.

Location.—In the SW. ¼ sec. 20, T. 36 S., R. 24 E., half a mile above mouth of canyon, 1 mile above the wagon bridge near Plush, and 1½ miles northwest of Plush, Lake County; below all tributaries.

Drainage area.—156 square miles (measured on maps issued by United States Reclamation Service; revised since publication of Water-Supply Paper 390).

Records available.—May 13, 1909, to September 30, 1914; March 1 to May 16, 1915, when station was discontinued.

Gage.—Barrett & Lawrence water-stage recorder on left bank; installed March 29, 1912; washed away April 15, 1915, in flood caused by the breaking of a dam on Snyder Creek and replaced by a Fuller recorder temporarily installed May 1; temporary staff gage at same site April 16–30, 1915; staff read daily. May 13, 1909, to January 23, 1910, vertical staff gage fastened to wagon bridge at Plush; affected by backwater from a temporary diversion dam and was not replaced after being washed out January 23, 1910. February 24, 1910, to March 9, 1911, vertical staff gage, in two sections, on right bank, half a mile above mouth of the canyon and 1 mile above bridge. March 10, 1911, to January 12, 1912, vertical staff on left bank at datum 1.0 foot lower than that of previous gage; gage-height records, beginning February 24, 1910, have been corrected to this datum. January 13, 1912, Barrett & Lawrence water-stage recorder installed, but proved to be in backwater from diversion dam. March 29, 1912, water-stage recorder installed at its final site, about 50 feet below staff gage and referred to old staff gage used 1910–11. February 13, 1913, reference gage installed on stilling well; datum approximately 1.0 foot lower than that used in 1912. This last datum was maintained until station was discontinued, May 16, 1915.

Discharge measurements.—Made from cable installed May 27, 1914, about 500 feet below gage, or by wading.

Channel and control.—Bed composed of gravel and boulders; may shift in extreme floods by rolling of rocks; control section for high water is a few feet downstream from that for low water and evidently permanent.

Extremes of discharge.—Maximum gage height (except on April 15, when dam failde), 3.35 feet night of May 3, observed from high-water marks the next day (discharge, 165 second-feet); minimum discharge for year may have been as low as 1 second-foot in September.

1910–1915: Maximum stage recorded, 6.30 feet February 24, 1910, on gage installed that day (discharge, 2,240 second-feet, by current-meter measurement); minimum stage, —0.46 foot July 18, 1910 (discharge, 0.94 second-foot).

Flood of April 15.—The dam on Snyder Creek, about 14 miles above Plush, broke during night of April 14 and crest of flood reached Plush about 4 a. m. April 15. High water is said to have lasted only about two hours. All irrigation diversion dams near Plush were washed away.

The crest of the flood reached a height of 9.20 feet at the recording gage and 8.31 feet at the old gage 50 feet above. The high-water curve defined by 1910 measurements would give a discharge of 3,840 second-feet.

The water was 0.3 foot higher in the blacksmith shop, near the bridge across Honey Creek, than the high-water mark of February, 1890, which would indicate a maximum of about 3,500 second-feet for that flood. This is, of course, subject to error.

There were stored in the Snyder Creek reservoir, when it failed (according to a survey by P. V. Hodges), 571 acre-feet. It may be assumed that about 10 per cent of this was lost en route to the Plush station, leaving 514 acre-feet, equivalent to 259 second-feet for the day. By adding to this 49 second-feet for the natural flow which was interpolated between April 14 and 16, 308 second-feet is obtained; 310 may be used as the probable mean for the day. If the peak discharge of 3,840 second-feet had lasted two hours it would have delivered about 640 acre-feet. This is a rough check on the maximum. The water was probably fairly high, approaching the maximum for about two hours and then gradually lowered to the natural flow.

Winter flow.—Stage-discharge relation affected by ice. Observations discontinued during winter.

Diversions.—A small quantity of water is diverted near head of stream and used to irrigate a few hundred acres; with this exception the total run-off from the basin above the station is shown by the records.

Regulation.—By storage in Snyder Creek dam before it was washed out.

Accuracy.—Conditions during 1914 and 1915 have been favorable; records good. Records for 1912 and earlier years poor.

Discharge measurements of Honey Creek near Plush, Oreg., during the period Nov. 12, 1914, to Oct. 5, 1915

Date.	Made by—	Gage height.	Discharge.	Date.	Made by—	Gage height.	Discharge.
		Feet.	*Sec.-ft.*			*Feet.*	*Sec.-ft.*
Nov. 12	J. E. Stewart	0.64	4.3	Apr. 17	P. V. Hodges	2.12	50.3
Mar. 21	P. V. Hodges	1.16	15.2	18	.....do	2.28	60.6
31	.....do	1.34	20.7	22	.....do	1.88	38.8
Apr. 2	.....do	1.70	38.2	23	.....do	1.73	33.8
7	.....do	1.68	35.9	24	.....do	2.04	49.1
8	.....do	1.61	31.7	May 4	.....do	2.56	84.8
12	.....do	1.93	44.7	4	.....do	2.51	83.8
13	.....do	2.15	57.3	Oct. 5	Henshaw and Batchelder	a .30	1.5
15	.....do	1.99	44.3				

a Roughly approximate.

Daily discharge, in second-feet, of Honey Creek near Plush, Oreg., for the year ending Sept. 30, 1915.

Day.	Mar.	Apr.	May.	Day.	Mar.	Apr.	May	Day.	Mar.	Apr.	May.
1	8	22	45	11	8	50	125	21	15	48	......
2	8	35	45	12	8	55	78	22	16	40	......
3	8	86	159	13	9	51	70	23	19	34	......
4	8	50	85	14	10	48	70	24	25	46	......
5	8	44	69	15	13	310	63	25	19	60	......
6	7	40	45	16	15	50	56	26	18	50	......
7	7	35	38	17	18	54	......	27	16	40	......
8	7	31	43	18	21	59	......	28	26	38	......
9	7	47	48	19	16	51	......	29	31	42	......
10	7	48	74	20	16	50	......	30	24	54	......
								31	21	......	......

Note.—Discharge determined from a fairly well defined rating curve Mar. 1 to Apr. 14 and from a well-defined curve Apr. 16 to May 16. Mean discharge Apr. 15 has been estimated by adding that resulting from the release of stored water to natural flow as interpolated between the records of Apr. 14 and 16. Discharge Mar. 1-2 estimated.

Monthly discharge of Honey Creek near Plush, Oreg., for the year ending Sept. 30, 1915.

Month.	Discharge in second-feet.			Run-off (total in acre-feet).	Accuracy.
	Maximum.	Minimum.	Mean.		
March	31	7	14.2	873	B.
April	310	22	55.6	3,310	B.
May 1-16	159	38	69.6	2,210	B.
The period	....	....	....	6,390	

PELICAN LAKE NEAR ADEL, OREG.

Location.—In the NW. ¼ sec. 10, T. 39 S., R. 24 E., on west shore of lake, about 2 miles north of Adel, Lake County.

Records available.—Occasional readings February 17, 1913, to April 18, 1915.

Gage.—Vertical staff spiked to a juniper post.

Gage height, in feet, of Pelican Lake near Adel, Oreg., for the year ending Sept. 30, 1915.

March 25	6.50	April 7	6.60
31	6.55	18	6.40

CRUMP LAKE NEAR ADEL, OREG.

Location.—In the SE. ¼ sec. 22, T. 38 S., R. 24 E. (unsurveyed), on the west shore of the lake, 8 miles north of Adel, Lake County.

Records available.—May 21, 1910, to January 15, 1912; occasional readings in 1913, 1914, and 1915.

Gage.—Vertical staff fastened to a large boulder 50 feet east of county road; datum 4,464.4 feet (United States Reclamation Service datum, which is approximately sea level).

Extremes of stage.—Maximum stage recorded during year, 2.48 feet April 8; minimum stage, —.06 foot October 16. From high-water marks on rocks, it appears that the lake has reached a stage of about 5.2 feet.

Gage height, in feet, of Crump Lake near Adel, Oreg., for the period Mar. 25 to Oct. 16, 1915.

March 25	1.73	May 5	2.32
April 3	2.32	12	2.22
8	2.48	October 16	—.06
18	2.37		

HART LAKE NEAR PLUSH, OREG.

Location.—On line between secs. 23 and 26, T. 36 S., R. 24 E., 2 miles north of mouth of Honey Creek, and 2 miles northeast of Plush, Lake County.

Records available.—Occasional readings from June 8, 1910, to September 30, 1915.

Gage.—Vertical staff nailed to a post; datum used in 1914 and 1915 probably higher than that used in previous years; present gage datum about 4,461 feet above sea level.

Extremes of stage.—Maximum gage height recorded during year, 1.86 feet May 4; lowest reading 0.95 foot September 27. Extreme high-water mark noted on this lake is at gage height 5.0 feet.

Gage height, in feet, of Hart Lake near Plush, Oreg., for the year ending Sept. 30, 1915.

March 21	1.33	April 16	1.47
24	1.33	May 4	1.86
31	1.37	September 27	.95

FLAGSTAFF LAKE NEAR PLUSH, OREG.

Location.—In sec. 5, T. 35 S., R. 25 E., in a slough at the south end of lake, 15 miles north of Plush, Lake County.

Records available.—May 31 to June 30, 1910; April 30, 1911, to September 30, 1915 (readings at irregular intervals).

Gage.—Vertical staff attached to bridge pile; elevation 4,533.5 feet, United States Reclamation Service datum.

Extremes of stage.—Maximum stage recorded during year, 0.85 foot March 23; minimum stage, —1.6 feet September 28 (lowest stage on record). The lake had no doubt been falling steadily since the spring of 1914, as practically no water flowed into lake in 1915. Highest recorded stage is 4.15 feet, May 31, 1910. From high-water marks observed in 1914 J. E. Stewart estimated that the highest stage reached in 1910 was 4.5 feet and that the lake had within comparatively recent times been up to about 11.8 feet.

Gage height, in feet, of Flagstaff Lake near Plush, Oreg., during year ending Sept. 30, 1915.

March 23	0.85	September 28	—1.6
May 3	.57		

LOWER CAMPBELL LAKE NEAR PLUSH, OREG.

Location.—In sec. 23, T. 34 S., R. 26 E., and sec. 36, T. 34 S., R. 25 E., on east shore of lake near road, about 20 miles northeast of Plush, Lake County.

Records available.—Occasional readings in 1914 and 1915.

Gage.—Height of water surface determined by leveling from one of two bench marks.

Elevation, in feet, of Lower Campbell Lake, for the period June 3, 1914, to Oct. 5, 1915.

1914.		1915.	
June 3	11.34	Mar. 23	10.00
July 1	11.87	May 3	9.67
		Oct. 5	7.47

STONE CORRAL LAKE NEAR PLUSH, OREG.

Location.—In secs. 20 and 21, T. 34 S., R. 26 E., on east side of lake near road, about 20 miles northeast of Plush, Lake County.

Records available.—Occasional readings during 1914 and 1915.

Gage.—Height of water surface determined by leveling from one of two bench marks.

Elevation, in feet, of Stone Corral Lake near Plush, Oreg., for period June 3 1914, to Oct. 5, 1915.

1914.		1915.	
June 3	11.26	Mar. 23	10.00
July 1	11.67	May 3	9.72
		Oct. 5	7.59

BLUEJOINT LAKE NEAR PLUSH, OREG.

Location.—In sec. 15, T. 33 S., R. 26 E., about 2 miles south of Warren Laird's ranch house, and 30 miles north of Plush, Lake County.

Records available.—Occasional readings March 21, 1911, to September 30, 1915.

Gage.—Vertical staff on post in lake bed about 200 yards from Laird's pumping plant. Another staff was read in 1911; since then water has fallen below it and water surface has been obtained by leveling from a bench mark; all readings have been referred to the present datum, which is probably slightly below the lowest point of the lake bed.

The lake was dry during the entire year ending September 30, 1915.

ABERT LAKE BASIN.

CHEWAUCAN RIVER AT DAM SITE NEAR PAISLEY, OREG.

Location.—In the NW. ¼ sec. 10, T. 36 S., R. 18 E., ¼ mile below site of proposed reservoir dam of the Paisley project of the Northwest Townsite Co., half a mile below Little Swamp Creek, a mile below South Creek, and about 20 miles south of Paisley, Lake County.

Drainage area.—158 square miles (measured on map of Fremont National Forest).

Records available.—June 25, 1912, to September 30, 1915 (fragmentary).

Gage.—Vertical staff on right bank. Stevens eight-day water-stage recorder installed May 26, 1915.

Discharge measurements.—Made from cable 20 feet below gage or by wading.

Channel and control.—Bed composed of gravel and boulders; fairly permanent.

Extremes of discharge.—Maximum stage recorded during year, 2.45 feet at 9.30 p. m., April 20 (discharge, 272 second-feet); minimum stage, 0.62 foot at 7 a. m. November 18 (discharge 10 second-feet); low stage was caused by the freezing of the river above, temporarily holding back the water.

1912–1915: Maximum and minimum occurred in 1915.

Winter flow.—Stage-discharge relation seriously affected by ice; flow estimated from discharge measurements, observer's notes, and records of temperature.

Diversions.—None.

Regulation.—None.

Accuracy.—Records excellent except when stage-discharge relation was affected by ice.

Cooperation.—Field data furnished by Northwest Townsite Co.

Discharge measurements of Chewaucan River at dam site near Paisley, Oreg., during the year ending Sept. 30, 1915.

Date.	Made by—	Gage height.	Discharge.	Date.	Made by—	Gage height.	Discharge.
		Feet.	*Sec.-ft.*			*Feet.*	*Sec.-ft.*
Oct. 20	Daniels and Arbuckle..	1.37	59	Apr. 22	W. S. Daniels..........	2.25	222
Dec. 7	Daniels and Gilmour...	[a]1.52	41.8	June 10	.....do..................	1.95	165
Feb. 16	.....do..................	[a]1.60	40	July 2	.....do..................	1.25	57
Mar. 4	Daniels and Beane.....	[a]1.18	40.6	22	.....do..................	1.00	34.8
23	W. S. Daniels..........	1.68	110	Sept. 4	.....do..................	.89	23.8
23	.....do..................	1.81	132				

[a] Stage-discharge relation affected by ice.

Daily discharge, in second-feet, of Chewaucan River at dam site near Paisley, Oreg., for the year ending Sept. 30, 1915.

Day.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.
1	30	41	43	43	34	39	150	210	220	56	38	25
2	37	43	38	43	43	32	190	190	215	57	35	25
3	41	40	38	46	48	38	200	170	206	57	33	25
4	35	37	38	48	29	40	160	170	196	57	32	25
5	35	37	38	38	27	42	130	160	192	57	31	25
6	34	37	38	38	22	38	130	150	190	60	31	25
7	35	29	38	31	22	34	140	150	190	68	28	25
8	35	37	28	26	20	36	130	150	184	61	28	25
9	34	37	22	17	22	38	130	222	172	60	28	25
10	46	35	26	20	18	34	160	248	160	56	28	25
11	45	35	26	18	18	38	190	222	158	49	28	25
12	41	33	26	16	12	37	180	222	148	46	28	27
13	41	43	19	14	13	48	190	222	132	44	28	28
14	37	33	26	14	34	54	160	235	124	44	30	28
15	35	48	26	14	17	80	170	200	118	43	31	28
16	34	39	26	12	36	54	190	200	115	42	29	28
17	36	36	26	14	43	85	222	210	112	41	28	28
18	43	30	26	16	38	100	235	222	109	41	28	26
19	75	27	16	24	36	86	248	210	104	38	28	25
20	62	27	26	19	37	100	260	190	100	35	27	25
21	48	27	13	25	41	108	248	190	93	35	27	25
22	43	27	34	13	25	115	222	210	87	34	27	25
23	41	27	62	16	28	150	210	210	85	33	27	25
24	41	35	74	25	30	150	200	235	82	33	28	25
25	40	43	80	30	32	122	190	200	78	33	28	25
26	40	49	80	62	29	115	180	202	76	32	28	25
27	37	38	86	52	48	115	210	200	72	32	27	25
28	37	37	80	48	48	180	210	218	68	34	26	25
29	37	37	74	52	......	140	235	218	63	38	25	25
30	41	43	57	43	......	122	210	220	60	41	25	25
31	41	......	43	34	......	130	......	220	......	45	25	......

NOTE.—Discharge determined from two rating curves, one well defined between 30 and 70 second-feet, used Oct. 1 to Nov. 29; the other well defined above 20 second-feet, used Mar. 17 to Sept. 30. Discharge Nov. [illegible] and Nov. 30 to Mar. 16 estimated from discharge measurements, observer's notes of ice thickness, conditions at control, and records of temperature; daily records during winter are subject to error, but the mean discharge for a week or longer is probably correct within 25 per cent.

Monthly discharge of Chewaucan River at dam site near Paisley, Oreg., for the year ending Sept 30, 1915.

Month.	Discharge in second-feet.			Run-off (total in acre-feet).	Accuracy.
	Maximum.	Minimum.	Mean.		
October	75	30	40.5	2,490	A.
November	49	27	36.2	2,150	B.
December	86	13	41.1	2,530	C.
January	62	12	29.4	1,810	D.
February	48	12	30.4	1,690	D.
March	180	32	80.6	4,960	B.
April	260	130	189	11,200	A.
May	248	150	202	12,400	A.
June	220	60	130	7,740	A.
July	68	32	45.2	2,780	A.
August	38	25	28.7	1,760	A.
September	28	25	25.6	1,520	A.
The year	260	12	73.4	53,000	

CHEWAUCAN RIVER NEAR PAISLEY, OREG.

Location.—In the SW. ¼ sec. 27, T. 33 S., R. 18 E., just above mouth of Mill Creek, half a mile above intake of Conn ditch, and about 2½ miles upstream from Paisley, Lake County.

Drainage area.—263 miles (measured on map of Fremont National Forest). At a former gaging station, about 2 miles downstream, the measured drainage area is 272 square miles.

Records available.—January 20, 1914, to September 30, 1915. Records giving practically the same yearly run-off are available as follows: Chewaucan River above Mill Creek near Paisley, Oreg., November 6, 1912, to September 30, 1914; Chewaucan River above Conn ditch, near Paisley, Oreg., April 8 to July 13, 1912; Chewaucan River at Paisley, Oreg., January 4, 1905, to December 31, 1907, and January 18, 1909, to April 15, 1912.

Gage.—Lietz water-stage recorder, owned and operated by Chewacan Land and Cattle Co., on left bank. Vertical staff on left bank, 50 feet below recorder is read about three times a week; these readings used when the recorder is not running (Chewaucan River above Mill Creek station gage). Both gages refer to same datum, but slope of water surface causes a slight difference in comparative readings on the two gages.

Discharge measurements.—Made from cable about 30 feet below gage or by wading.

Channel and control.—Bed composed of gravel and boulders; control, just above mouth of Mill Creek, is composed of larger rocks; shifts only slightly at high water. Stage of zero flow about —0.3 foot gage height.

Extremes of discharge.—Maximum stage during year from water-stage recorder, 2.40 feet at 6 a. m. April 20 (discharge, 330 second-feet); minimum stage from water-stage recorder, 0.67 foot at 11.30 a. m. November 15 (discharge, 21.5 second-feet). Discharge was practically as low at 6 p. m. November 20 (gage height, 0.72 foot), backwater estimated 0.04 foot, discharge, 22 second-feet.

1905–1907 and 1909–1914: Maximum stage recorded, 9.40 feet at 5 p. m. November 23, 1909 (discharge, estimated from extension of rating curve, 4,000 second-feet); minimum stage, 3.4 feet August and September, 1905, and August, 1907 (discharge, 19 second-feet). These extreme stages were recorded at stations in the immediate vicinity, which have been discontinued.

Winter flow.—Stage-discharge relation seriously affected by ice; flow estimated from discharge measurements, observer's notes, and records of temperature.

Diversions.—Not more than two or three hundred acres irrigated above station.

Regulation.—None.

Accuracy.—Records excellent, except during periods when ice affected stage-discharge relation or gage was not working.

Cooperation.—Gage-height record and some measurements furnished by W. C. Hammatt, engineer for Chewacan Land & Cattle Co.; some measurements by Northwest Townsite Co.

Discharge measurements of Chewaucan River near Paisley, Oreg., during the year ending Sept. 30, 1915.

Date.	Made by—	Gage height.	Discharge.	Date.	Made by—	Gage height.	Discharge.
		Feet.	*Sec.-ft.*			*Feet.*	*Sec.-ft.*
Oct. 22	Bert. Harber [a]	1.10	52	Apr. 2	W. S. Daniels	1.85	185
Nov. 21	W. S. Daniels [b]	[c] 1.00	24.1	28	Guinee and Harber	2.07	262
28	Bert. Harber	[c] 1.30	45	May 16	Hodges and Daniels	2.04	232
Dec. 11	James E. Stewart	[c] 1.42	29.2	27	Richard Guinee	2.01	226
19	Arbuckle and Guinee [a]	[c] 1.67	47.5	June 21	.....do	1.36	112
Jan. 28	Richard Guinee	[c] 1.20	45.2	22	W. S. Daniels	1.35	91
21	H. K. Gilmour [b]	[c] 1.25	40.8	July 27	.....do	.81	29.6
Feb. 9	Daniels and Gilmour	[c] 1.16	51	27	Richard Guinee	.80	28.6
16	Richard Guinee	[c] 1.02	51	Aug. 23	Bert. Harber	.75	24.6
24	W. S. Daniels	1.10	54	Sept. 20	.....do	.75	27.2
Mar. 10	.....do	1.13	61				
16	Hodges and Daniels	1.26	77				
28	Richard Guinee	1.40	131				

[a] Employee of Chewacan Land & Cattle Co.
[b] Employee of Northwest Townsite Co.
[c] Stage-discharge relation affected by ice.

Daily discharge, in second-feet, of Chewaucan River near Paisley, Oreg., for the year ending Sept. 30, 1915.

Day.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.
1	39	53	36	62	106	54	154	222	234	58	41	23
2	42	51	51	62	114	52	198	210	234	55	39	23
3	51	51	42	59	99	54	247	198	222	52	33	23
4	44	51	58	59	91	53	198	186	210	52	31	24
5	42	47	60	62	83	51	164	175	198	55	31	26
6	43	44	41	58	64	54	154	175	198	55	30	26
7	44	45	42	55	62	53	154	175	186	59	29	26
8	41	40	38	56	58	45	144	175	186	59	28	25
9	40	63	32	55	53	42	154	210	186	55	29	26
10	47	42	35	55	47	47	175	272	164	52	29	26
11	54	44	35	55	44	55	186	272	164	48	29	26
12	54	60	36	52	54	62	222	247	154	47	29	28
13	52	53	36	48	48	70	222	234	144	44	28	27
14	51	45	36	46	52	86	198	247	135	43	28	27
15	46	42	36	44	51	104	198	234	126	42	29	28
16	44	55	36	42	55	115	222	222	126	40	29	27
17	45	41	36	36	62	120	247	234	114	38	29	27
18	56	42	36	34	74	133	272	247	108	39	29	27
19	80	44	40	36	91	117	289	247	106	38	28	26
20	90	34	38	43	77	126	301	234	97	38	27	25
21	68	37	35	38	63	135	301	222	94	37	27	26
22	62	43	28	36	50	144	268	210	88	35	26	26
23	63	53	46	32	54	164	242	210	86	33	26	25
24	59	47	101	35	58	186	234	234	85	32	27	26
25	53	51	125	41	58	154	222	234	85	32	27	26
26	51	52	121	60	58	154	234	210	88	30	26	26
27	51	60	128	62	56	144	234	210	82	30	25	25
28	50	50	116	71	55	175	247	222	71	30	24	26
29	51	37	114	76	......	175	260	234	68	35	23	26
30	51	39	113	78	......	154	260	234	63	36	22	26
31	53	......	88	86	......	154	......	234	......	40	23	......

NOTE.—Discharge determined from well-defined rating curve. Discharge estimated, because of ice Nov. 20-24 and Nov. 29 to Feb. 15. Recorder not working Feb. 20 to Mar. 3; staff gage was read Feb. 20 to Mar. 3, Feb. 22, 24, 26, 27, and Mar. 2 and 3; discharge interpolated for days when gage was not read.

Monthly discharge of Chewaucan River near Paisley, Oreg., for the year ending Sept. 30, 1915.

Month.	Discharge in second-feet.			Run-off (total in acre-feet).	Accuracy.
	Maximum.	Minimum.	Mean.		
October	99	39	52.7	3,240	A.
November	64	34	47.2	2,810	B.
December	125	28	58.4	3,590	C.
January	86	32	52.4	3,220	D.
February	114	44	65.7	3,650	C.
March	186	42	105	6,460	B.
April	301	144	220	13,100	A.
May	272	175	222	13,600	A.
June	234	63	137	8,150	A.
July	59	30	43.2	2,660	A.
August	41	22	28.4	1,750	A.
September	28	23	25.8	1,540	A.
The year	301	22	88.0	63,800	

CHEWAUCAN RIVER AT THE NARROWS, NEAR PAISLEY, OREG.

Location.—Near the west line of sec. 19, T. 34 S., R. 20 E., at a constriction in Chewaucan Marsh known as The Narrows, about half a mile below lower end of outside canal, and 12 miles southeast of Paisley, Lake County. Moss Creek enters the upper marsh 3 miles northwest of station but seldom contributes any water to the river.

Drainage area.—Not measured.

Records available.—January 18, 1914, to September 30, 1915.

Gage.—Vertical staff on left bank; read daily by William Koenig and W. W. Hampton, for Chewacan Land & Cattle Co., and three times a week, beginning May 14, 1915, by Mrs. B. A. Webster, for Northwest Townsite Co. During ice period of 1914–15 gage was raised 0.25 foot and was not corrected.

Discharge measurements.—At low water, made by wading; at high water, from plank projecting from a wagon drawn across river by a horse on shore.

Channel and control.—Bed composed of gravel, which has been lowered somewhat by dredging; shifts during floods. Stage-discharge relation may be affected in the summer by the growth of aquatic plants; banks not subject to overflow.

Extremes of discharge.—1914: Maximum stage recorded, 3.50 feet April 20–21 and 24 (discharge, 505 second-feet); minimum stage, 1.00 foot September 8 (discharge, 4 second-feet).

1915: Maximum stage recorded, 1.8 feet April 26 (discharge, 154 second-feet); minimum stage, 0.22 foot September 10 (channel dry).

Winter flow.—Stage-discharge relation affected by ice for two or three months each winter; flow estimated from discharge measurements, observer's notes, and records of temperature.

Diversions.—About 6,200 acres of upland and 14,300 acres of marsh hay land are irrigated between the gage above Paisley and this station.

Regulation.—Discharge varies considerably owing to the manipulation of dams and ditches used for irrigating, and to operation of dredge above the station, which was cuttting a new channel for river.

Accuracy.—Records good, except for periods when stream was obstructed by ice. Conditions for measuring good, and sufficient measurements have been obtained to define curves for periods between the shift in control. After the change in datum during the winter a new rating curve was developed to agree with subsequent measurements.

Cooperation.—Current-meter measurements and gage readings furnished by Chewacan Land & Cattle Co., W. C. Hammatt, engineer, and Northwest Townsite Co.

Discharge measurements of Chewaucan River at The Narrows, near Paisley, Oreg., during the period Jan. 19, 1914, to Sept. 30, 1915.

Date.	Made by—	Gage height.	Discharge.	Date.	Made by—	Gage height.	Discharge.
1914.		*Feet.*	*Sec.-ft*	1914–15.		*Feet*	*Sec -ft*
Jan. 19	S. A. Mushen[a]	1.60	67	Oct. 16	Daniels and Taylor	1.34	29.7
Feb. 27	R. A. Harrower[b]	1.59	79	23	Bert Harber	1.30	24.1
Mar. 12	Bert Harber[a]	2.70	289	26	Daniels and Taylor	1.45	37.9
21	W. S. Daniels[b]	3.07	376	Nov. 21	Bert Harber	1.35	[c]25.7
Apr. 3	do	2.58	271	Dec. 5	Daniels and Gilmour	1.61	[c]42.4
7	M. S. Edson[a]	2.73	306	22	Richard Guinee[a]	1.50	[c]21.6
16	W. S. Daniels	3.38	474	28	H. K. Gilmour[b]	1.64	[c]27.9
25	Bert Harber	3.45	498	Jan. 24	Richard Guinee	1.30	[c]24.1
27	W. S. Daniels	3.34	450	Feb. 14	do	1.25	46.2
May 2	do	2.93	363	15	Daniels and Gilmour	1.29	52
7	do	2.74	297	Mar. 6	do	1.29	53
12	do	2.87	338	24	W. S. Daniels	1.44	78
21	Daniels and Moore	3.20	403	25	Richard Guinee	1.42	83
21	Bert Harber	3.20	401	Apr. 20	do	1.70	143
26	Daniels and Moore	3.27	402	May 15	P. V. Hodges	1.14	36.9
June 2	Bert Harber	3.10	359	25	Richard Guinee	1.35	66
10	Daniels and Moore	2.77	270	June 3	W. S. Daniels	1.14	32.6
15	do	2.56	224	14	Guinee and Harber	1.00	18.6
23	do	1.97	113	21	W. S. Daniels	.92	11.4
July 2	Arbuckle and Moore[b]	1.65	72	July 25	Bert Harber	.95	16.1
7	do	1.59	62	28	W. S. Daniels	.92	11.2
20	Daniels and Moore	1.36	28.8	Aug. 20	Bert Harber	.85	8.14
20	Bert Harber	1.35	27.0	21	W. S. Daniels	.84	7.6
Aug. 7	Daniels and Moore	1.20	15.6	Sept. 11	do	.53	.7
21	Bert Harber	1.20	12.8	19	Bert Harber	.75	4.8
Sept. 25	do	1.15	14.0	30	W. S. Daniels	1.06	22.5

[a] Employee of Chewacan Land & Cattle Co.
[b] Employee of Northwest Townsite Co.
[c] Stage-discharge relation affected by ice.

Daily discharge, in second-feet, of Chewaucan River at The Narrows, near Paisley, Oreg., for the period Jan. 18, 1914, to Sept. 30, 1915.

Day.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.
1914.												
1	......	......	......	......	67	110	332	370	370	72	15	8
2	......	......	......	......	61	110	295	358	355	65	15	8
3	......	......	......	......	55	102	270	345	355	63	15	6
4	......	......	......	......	61	80	245	332	330	62	15	4
5	......	......	......	......	61	80	282	320	318	60	15	6
6	......	......	......	......	55	195	295	320	305	59	15	8
7	......	......	......	......	55	215	308	308	305	57	15	6
8	......	......	......	......	50	245	295	308	305	55	12	4
9	......	......	......	......	50	282	295	320	292	54	15	8
10	......	......	......	......	50	295	332	320	280	52	20	6
11	......	......	......	......	45	295	345	332	268	50	15	6
12	......	......	......	......	45	295	345	332	242	48	20	15
13	......	......	......	......	45	320	345	332	242	47	20	6
14	......	......	......	......	45	332	420	358	230	45	15	6
15	......	......	......	......	45	345	432	370	220	42	15	8
16	......	......	......	......	50	358	460	370	200	40	15	8
17	......	......	......	......	55	370	460	382	190	37	15	24
18	......	......	......	67	67	382	475	382	180	34	14	29
19	......	......	......	67	74	382	490	370	160	32	12	24
20	......	......	......	67	74	382	505	385	140	29	12	20
21	......	......	......	67	88	382	505	385	130	29	15	24
22	......	......	......	61	102	382	490	385	122	24	15	29
23	......	......	......	55	102	395	490	400	108	24	20	15
24	......	......	......	50	88	382	505	400	100	24	12	15
25	......	......	......	74	74	370	490	400	108	24	6	12
26	......	......	......	67	74	370	475	400	108	24	8	15
27	......	......	......	61	80	345	460	400	100	20	8	24
28	......	......	......	61	95	320	445	400	92	20	6	20
29	......	......	......	67	......	282	420	400	85	20	6	20
30	......	......	......	74	......	332	408	385	78	20	6	20
31	......	......	......	74	......	345	......	370	......	15	6	......
1914-15.												
1	20	40	29	34	48	55	41	72	42	10	17	6.0
2	24	40	24	28	48	48	41	72	34	18	22	6.0
3	24	38	45	34	64	48	64	72	31	22	17	1.5
4	24	36	52	28	41	55	90	55	28	28	14	.5
5	24	34	42	22	41	48	79	55	28	31	14	.4
6	24	34	52	28	41	55	64	52	28	34	14	.2
7	24	34	45	22	55	48	55	48	26	34	10	.1
8	24	34	52	22	55	34	55	41	22	34	10	0
9	24	34	40	22	72	41	55	41	22	36	8.4	0
10	24	34	40	22	55	48	48	48	22	34	8.0	0
11	29	34	40	22	34	49	55	64	22	28	7.6	.5
12	29	40	24	22	48	48	64	48	22	28	6.0	1.5
13	29	40	29	22	48	55	81	41	21	28	6.0	1.4
14	29	40	12	28	46	55	72	34	18	26	6.0	1.5
15	29	40	16	22	52	72	64	33	17	22	8.0	5.7
16	29	34	9	22	48	72	64	28	17	22	7.2	10
17	29	34	12	22	55	64	81	28	17	22	8.0	10
18	29	34	24	28	64	76	120	28	14	22	7.6	6.0
19	34	29	29	28	41	64	130	33	14	26	8.0	4.5
20	40	20	34	28	55	48	130	34	14	22	7.6	6.8
21	34	26	34	28	48	48	130	41	13	21	7.6	2.2
22	24	26	22	28	48	55	130	48	10	17	8.0	4.2
23	24	27	12	28	48	64	90	41	10	17	6.0	4.5
24	20	29	24	24	49	76	90	48	14	14	6.0	6.0
25	40	30	22	28	48	81	142	62	10	14	5.4	6.0
26	36	32	20	34	48	64	154	64	10	11	6.0	6.0
27	40	34	24	41	48	48	137	58	10	10	6.0	9.0
28	34	35	28	48	55	40	120	55	11	10	6.0	10
29	34	32	29	41	......	64	130	49	10	10	6.0	3.0
30	34	29	29	41	......	55	98	48	8.4	14	6.0	26
31	40	......	34	48	......	48	......	41	......	17	6.0	......

NOTE.—Discharge determined from rating curves as follows: Jan. 19 to May 15, 1914, well defined above 70 second-feet; May 20 to Dec. 31, 1914, well defined from 15 to 450 second-feet; Jan. 1 to Sept. 30, 1915, well defined throughout; May 16–19, by indirect method for shifting control. Discharge estimated on account of ice, as follows: Jan. 18 to Feb. 15, Nov. 15–22, 1914; Nov. 30, 1914, to Feb. 9, 1915, and Feb. 13, 1915. Discharge June 28 to July 1, July 3–6, 8–13, and 15–19, and Nov. 23–27, 1914, interpolated. The change in stage-discharge relation on Jan. 1 was due to heaving of gage by ice rather than to shift in control; the gage was not corrected and all gage-height records after this date are referred to a datum 0.25 foot higher than previous records.

Monthly discharge of Chewaucan River at Narrows near Paisley, Oreg., for the period Jan. 18, 1914, to Sept. 30, 1915.

Month.	Discharge in second-feet.			Run-off (total in acre-feet).	Accuracy.
	Maximum.	Minimum.	Mean.		
1914.					
January 18-31	67	50	65.1	1,810	C.
February	102	45	64.8	3,600	B.
March	395	80	298	18,600	A.
April	505	245	397	23,600	A.
May	400	308	363	22,300	A.
June	370	78	211	12,600	A.
July	72	15	40.2	2,470	B.
August	20	6	13.3	818	B.
September	29	4	13.2	785	B.
The period				86,000	
1914-15.					
October	40	20	29.1	1,790	A.
November	40	20	33.4	1,990	B.
December	52	9	29.9	1,840	C.
January	48	22	28.9	1,780	C.
February	72	34	50.1	2,780	B.
March	81	34	55.7	3,430	A.
April	154	41	89.1	5,300	A.
May	72	28	47.8	2,940	A.
June	42	8.4	18.8	1,120	A.
July	36	10	22.0	1,350	A.
August	22	5.4	8.88	546	A.
September	26	0	4.65	277	B.
The year	154	0	34.7	25,100	

CHEWAUCAN RIVER AT HOTCHKISS FORD, NEAR PAISLEY, OREG.

Location.—Near line between secs. 11 and 12, T. 35 S., R. 20 E., below lower Chewaucan Marsh, above Crooked Creek, and about 20 miles southeast of Paisley, Lake County. Willow Creek is tributary to the lower marsh but contributes water to it only at times of floods in the early spring, the entire flow being diverted for irrigation at other times.

Drainage area.—Not measured.

Records available.—January 18, 1914, to September 30, 1915.

Gage.—Vertical staff on left bank; read daily by William Koenig and W. W. Hampton, for Chewacan Land & Cattle Co., and three times a week, beginning May 14, 1915, by Mrs. B. A. Webster, for Northwest Townsite Co.

Discharge measurements.—Made by wading, at low stages; at high stages, from plank projecting from a wagon drawn across river by a horse on shore.

Channel and control.—Bed composed of fine gravel, sand, and mud; control somewhat shifting; growth of aquatic plants, mostly tules, affects stage-discharge relation the greater part of year. Banks low, and overflow is considerable at high stages.

Extremes of discharge.—1914: Maximum stage recorded, 4.50 feet April 24 (discharge, 400 second-feet); minimum stage, 1.25 feet September 5 (discharge, 8.0 second-feet).

1915: Maximum stage recorded, 2.25 feet February 9, when stage-discharge relation was affected by ice; maximum discharge, 90 second-feet (gage height, 2.0 feet) February 6; minimum, stream reported dry September 7.

WINTER FLOW.—Stage-discharge relation affected by ice three to four months each winter.

DIVERSIONS.—About 7,800 acres of marsh hay land are irrigated between the Narrows and Hotchkiss ford stations. A total of 28,300 acres is watered from river above station.

REGULATION.—Discharge may vary during irrigating season, owing to manipulation of dams and ditches for irrigating the marsh.

ACCURACY.—Records good for 1914, as effect of aquatic plant growth was fairly stable; fair for periods when stream was affected by ice; poor for summer of 1915, when flow was extremely low, but error introduced in total run-off is small.

COOPERATION.—Part of field data furnished by Chewacan Land & Cattle Co., through W. C. Hammatt, consulting engineer, and part by Northwest Townsite Co.

Discharge measurements of Chewaucan River at Hotchkiss ford, near Paisley, Oreg., during the period Jan. 18, 1914, to Sept. 30, 1915.

Date.	Made by—	Gage height.	Discharge.	Date.	Made by—	Gage height.	Discharge.
1914.		*Feet.*	*Sec.-ft.*	1914		*Feet.*	*Sec.-ft.*
Jan. 19	S. A. Mushen [a]	1.95	83	Oct. 23	Bert Harber	1.55	33.5
Mar. 12	Bert Harber [a]	3.50	248	26	Daniels and Taylor	1.60	34.1
Apr. 3	Daniels and Moore [b]	3.79	284	Nov. 21	Bert Harber	1.55	26.1
8	M. S. Edson [a]	3.25	235	Dec. 5	Daniels and Gilmour	[c] 1.72	41.1
16	Daniels and Moore	3.96	380	21	Richard Guinee [a]	[c] 1.80	23.9
25	Bert Harber	4.40	332	28	H. K. Gilmour [b]	[c] 1.85	21.1
27	Daniels and Moore	4.39	397				
May 2	do	4.13	340	1915.			
7	do	3.73	271	Jan. 25	Richard Guinee	[c] 1.75	23.8
12	do	3.56	234	Feb. 14	do	[c] 1.80	42.7
21	do	4.00	278	15	Daniels and Gilmour	1.58	52
22	Bert Harber	4.10	262	Mar. 11	do	1.54	49.2
26	Daniels and Moore	4.30	314	25	Richard Guinee	1.40	39.0
June 3	Bert Harber	4.30	293	Apr. 5	W. S. Daniels	1.05	3.0
15	Daniels and Moore	3.89	237	20	Richard Guinee	.95	(d)
23	do	2.99	132	May 15	P. V. Hodges	1.09	3.5
24	W. C. Hammatt [a]	2.90	127	25	Richard Guinee	1.10	2.8
27	Daniels and Moore	2.91	122	June 13	W. S. Daniels	.99	.8
July 2	Arbuckle and Moore	2.40	80	14	Richard Guinee	1.00	(d)
7	do	2.19	57	July 9	Daniels and Taylor	1.59	30.0
20	Daniels and Moore	1.75	28.2	25	Bert Harber	1.35	16.9
20	Bert Harber	1.75	31.1	Aug. 5	W. S. Daniels	1.30	12.8
Aug. 7	Daniels and Moore	1.39	10.5	20	Bert Harber	1.05	2.7
21	Bert Harber	1.40	14.9	21	W. S. Daniels	1.02	2.4
Sept. 25	do	1.45	17.8	Sept. 19	Bert Harber	1.00	.9
Oct. 16	Daniels and Taylor	1.62	30.3	30	W. S. Daniels	1.09	4.0

[a] Employee of Chewacan Land & Cattle Co.
[b] Stage-discharge relation affected by ice.
[c] Employee of Northwest Townsite Co.
[d] Velocity reported too small to measure.

Daily discharge, in second-feet, of Chewaucan River at Hotchkiss ford, near Paisley, Oreg., for the period Jan. 18, 1914, to Sept. 30, 1915.

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1914												
1	......	......	......	......	56	114	313	350	306	86	11	10
2	......	......	......	......	52	134	300	340	299	76	11	10
3	......	......	......	......	48	140	280	327	299	73	11	10
4	......	......	......	......	48	105	261	306	292	69	11	10
5	......	......	......	......	48	92	261	294	292	66	11	8.0
6	......	......	......	......	48	124	261	280	285	62	11	10
7	......	......	......	......	48	178	236	271	285	59	11	10
8	......	......	......	......	48	194	235	261	285	56	9.5	9.2
9	......	......	......	......	52	206	254	248	278	53	9.5	10
10	......	......	......	......	48	236	280	242	271	49	8.0	10
11	......	......	......	......	52	236	294	236	264	46	9.0	10
12	......	......	......	......	56	248	287	234	264	43	11	10
13	......	......	......	......	56	261	294	236	257	40	11	10
14	......	......	......	......	52	248	306	236	250	37	14	10
15	......	......	......	......	52	236	334	248	243	36	11	10
16	......	......	......	......	52	230	380	261	229	34	14	12
17	......	......	......	......	56	236	382	261	216	33	16	12
18	......	......	......	82	60	294	392	268	203	32	15	24
19	......	......	......	82	74	334	392	268	190	30	15	24
20	......	......	......	69	74	342	392	274	174	29	12	21
21	......	......	......	69	96	350	400	277	162	26	15	21
22	......	......	......	69	119	342	400	271	146	24	15	24
23	......	......	......	69	100	350	400	278	130	21	15	18
24	......	......	......	69	92	313	400	292	125	21	15	18
25	......	......	......	78	87	342	332	299	140	18	12	18
26	......	......	......	69	87	334	366	299	135	18	10	15
27	......	......	......	64	87	327	397	299	125	16	12	21
28	......	......	......	64	92	300	358	299	115	16	10	21
29	......	......	......	64	......	254	358	299	105	14	10	21
30	......	......	......	64	......	274	350	299	96	14	10	18
31	......	......	......	64	......	306	......	299	......	11	10	......
1914-15												
1	21	38	42	25	28	54	16	19	2.0	1.0	14	5.0
2	21	38	35	25	28	54	14	19	2.0	3.4	14	5.0
3	21	38	42	28	32	54	9.0	16	1.0	7.0	14	3.4
4	21	38	50	28	42	54	5.0	14	1.0	7.0	14	2.0
5	21	38	41	28	54	54	3.0	14	1.0	7.0	14	1.0
6	21	38	54	28	90	50	3.0	9.0	1.0	11	12	.5
7	21	35	50	25	76	50	3.0	7.0	1.0	16	11	0
8	21	35	50	25	67	50	3.0	5.0	1.0	19	11	0
9	21	35	54	25	72	50	1.0	3.0	1.0	28	10	0
10	21	35	46	22	62	46	1.0	5.0	1.0	32	9.0	0
11	21	35	46	22	62	50	1.0	5.0	1.0	25	7.0	0
12	24	35	32	25	67	50	1.0	5.0	1.0	22	7.0	0
13	24	35	28	25	62	50	1.0	5.0	.9	19	5.4	0
14	24	35	28	25	43	50	.5	3.8	1.0	19	5.0	0
15	24	35	22	26	52	54	.5	3.8	1.0	19	5.0	0
16	30	35	19	22	50	58	.5	2.4	1.0	18	5.0	0
17	24	35	19	22	50	62	.5	3.8	1.0	16	5.0	0
18	32	32	22	22	54	62	.5	5.0	1.0	16	5.0	.8
19	28	32	22	22	50	54	.5	5.0	.5	16	5.0	.9
20	38	28	25	22	62	50	0	4.6	.5	16	2.8	1.7
21	38	26	24	22	58	46	.5	5.0	.5	15	2.2	2.0
22	38	28	23	22	50	46	5.0	3.0	.5	16	5.0	2.0
23	34	29	22	22	50	50	16	3.0	.5	14	2.8	2.0
24	28	30	19	23	50	35	19	3.0	1.0	14	2.0	1.8
25	28	32	19	24	50	39	16	2.8	1.0	20	4.6	2.0
26	34	33	19	26	54	32	22	3.0	1.0	14	5.0	3.0
27	35	34	16	25	54	28	25	2.7	1.0	11	1.2	5.0
28	35	35	21	28	54	22	22	3.0	1.0	11	5.0	5.0
29	35	35	22	28	......	22	19	2.0	1.0	11	2.0	5.0
30	35	35	22	28	......	22	19	2.0	1.0	11	2.0	4.6
31	38	......	19	28	......	19	......	2.0	.....	14	2.5	......

NOTE.—Discharge determined from fairly well defined rating curves as follows: Jan. 19 to Apr. 3, May 2, to Aug. 10, and Aug. 18 to Oct. 17, 1914. Discharge for all other open-channel periods determined by indirect method for shifting control. Stage-discharge relation affected by ice, and flow estimated from measurements, observer's notes, and studies of temperature, as follows: Jan. 21–22, 27–29, Feb. 2–4, 6–11, Nov. 14–22, 1914; Nov. 23, 1914, to Feb 14, 1915. Discharge estimated Jan. 18, and interpolated June 28 to July 1, July 3–6, 8–13, 15–19, and Nov. 23–27, 1914.

Monthly discharge of Chewaucan River at Hotchkiss ford, near Paisley, Oreg., for the period Jan. 18, 1914, to Sept. 30, 1915.

Month.	Discharge in second-feet.			Run-off (total in acre-feet).	Accuracy.
	Maximum.	Minimum.	Mean.		
1914					
January 18–31	82	64	69.7	1,940	B.
February	119	48	65.7	3,650	B.
March	350	92	248	15,200	B.
April	400	235	330	19,600	B.
May	350	234	279	17,200	B.
June	306	95	215	12,800	A.
July	80	11	39.0	2,400	B.
August	16	8.0	11.8	726	B.
September	24	8.0	14.5	863	B.
The period				74,400	
1914–15					
October	38	21	27.6	1,700	B.
November	38	26	34.1	2,030	B.
December	54	16	30.7	1,890	C.
January	28	22	24.7	1,520	C.
February	90	28	54.4	3,020	B.
March	62	19	45.7	2,810	B.
April	25	0	7.58	448	C.
May	19	2.0	6.00	368	C.
June	2.0	.5	.98	58	
July	32	1.0	15.1	929	B.
August	14	1.2	6.76	416	C.
September	5.0	0	1.76	104	
The year	90	0	21.1	15,300	

CONN DITCH NEAR PAISLEY, OREG.

Location.—In the SE. ¼ sec. 27, T. 33 S., R. 18 E., just below road crossing, half a mile below intake of ditch, and about 2 miles southwest of Paisley, Lake County.

Records available.—July 17, 1914, to September 30, 1915.

Gage.—Vertical staff on left or upper side of ditch about 40 feet below road bridge; read daily, when water is diverted, by Richard Guinee, for Chewacan Land & Cattle Co.; read occasionally by W. S. Daniels.

Discharge measurements.—Made from bridge or by wading.

Channel and control.—Ditch not particularly well built or maintained; control somewhat shifting.

Extremes of discharge.—Maximum stage recorded, 1.75 feet July 20, 1914 (discharge, 19 second-feet); minimum, canal dry at times.

Winter flow.—Stage-discharge relation affected by ice; water generally turned out of canal during extremely cold weather.

Accuracy.—Records fair.

Cooperation.—Most of the gage readings and meter measurements furnished by the Chewacan Land & Cattle Co., W. C. Hammatt, consulting engineer, and some by the Northwest Townsite Co.

Conn ditch diverts from Chewaucan River in the SE. ¼ sec. 27, T. 33 S., R. 18 E., and about three-eighths mile below Mill Creek and the gaging station just above. The water is used for irrigating the Conn ranch, on a bench northwest of Paisley.

Discharge measurements of Conn ditch near Paisley, Oreg., during the period July 17, 1914, to Sept. 30, 1915.

Date.	Made by—	Gage height.	Discharge.	Date.	Made by—	Gage height.	Discharge.
		Feet.	*Sec.-ft.*			*Feet*	*Sec.-ft.*
1914.				1915.			
July 17	Bert Harber[a]	1.65	18.0	Apr. 23	Richard Guinee[a]	.65	4.1
21	Daniels and Moore[b]	1.72	16.3	May 27	....do	.55	2.5
Aug. 5	....do	1.05	6.9	June 5	W. S. Daniels	1.30	12.4
17	Bert Harber	1.15	8.6	8	....do	1.55	17.0
Sept. 20	....do	.45	.6	16	....do	1.10	9.3
Oct. 22	....do	.45	.6	21	Richard Guinee	1.10	11.2
Nov. 23	....do	[c].65	1.0	July 13	W. S. Daniels	.60	2.9
				27	....do	.60	3.3
				Aug. 23	Bert Harber	.60	2.2

[a] Employee of Chewacan Land & Cattle Co.
[b] Employee of Northwestern Townsite Co.
[c] Stage-discharge relation affected by ice.

Daily discharge, in second-feet, of Conn ditch near Paisley, Oreg., for the period July 17, 1914, to Sept. 30, 1915.

Day.	July.	Aug.	Sept.	Day.	July.	Aug.	Sept.	Day.	July.	Aug.	Sept.
1914.				1914.				1914.			
1		11	8.4	11	......	7.7	7.7	21	18	8.4	1.6
2		11	8.4	12	......	7.0	8.4	22	18	8.4	1.6
3		11	8.4	13	......	6.2	7.7	23	18	8.4	1.5
4		7.0	8.4	14	......	7.7	7.0	24	17	8.4	1.3
5		7.0	7.7	15	......	7.7	4.2	25	17	8.4	1.2
6		6.2	7.7	16	......	7.7	2.6	26	16	8.4	1.2
7		7.0	7.7	17	17	8.4	2.1	27	15	8.4	1.2
8		6.2	7.7	18	17	8.4	1.6	28	16	8.4	1.6
9		5.5	7.7	19	18	8.4	.8	29	16	8.4	1.6
10		6.2	7.7	20	19	8.4	.4	30	11	7.7	1.6
								31	11	7.7	......

Day.	Oct.	Nov.	Dec.	Apr.	May.	June.	July.	Aug.	Sept.
1914-15.									
1	1.6	0.6	0.5	....	3.9	11	4.4	2.9	1.8
2	1.2	.6	.5	....	4.4	12	4.3	2.9	1.2
3	1.4	.6	.5	....	4.4	12	4.0	2.9	2.2
4	1.2	.6	.5	....	4.4	12	4.4	4.7	2.2
5	1.2	.6	.5	....	3.3	12	3.9	4.4	1.8
6	1.2	.6	.5	....	1.6	12	3.9	4.7	1.8
7	1.2	.5	.5	....	2.4	12	3.9	4.4	2.8
8	1.2	.4	.4	....	2.4	14	3.8	4.4	2.5
9	1.2	.6	.4	....	2.9	16	3.9	4.4	2.2
10	1.2	.4	.3	....	3.4	15	3.4	4.3	2.2
11	1.2	.8	.2	....	3.9	17	2.9	4.4	2.2
12	1.2	.8	.2	5.0	4.4	10	2.9	3.7	2.2
13	1.2	.6	.2	5.0	3.9	3.9	2.9	2.2	2.2
14	1.2	.6	.1	3.4	3.4	11	2.9	2.8	2.2
15	1.2	.6	.1	1.2	3.4	11	2.9	2.2	2.8
16	.8	.6	.1	.9	3.4	9.5	2.9	2.2	2.8
17	1.2	.6	.1	5.6	3.4	10	2.9	1.8	2.7
18	.8	.6	.1	6.2	3.4	9.2	2.9	1.8	3.0
19	.8	.3	....	3.9	3.1	9.5	2.9	2.0	3.2
20	.8	.4	....	3.9	2.9	9.2	2.9	1.9	2.8
21	.6	.4	....	3.9	2.9	9.2	2.9	1.8	2.7
22	.6	.3	....	3.4	2.9	8.9	2.5	1.8	2.2
23	1.0	1.0	....	3.4	2.9	9.2	2.4	2.2	2.5
24	.8	.8	....	3.4	2.9	8.9	2.8	2.2	3.2
25	.8	.6	....	2.9	2.9	8.4	2.9	2.2	3.2
26	.8	.4	....	2.9	2.9	8.2	2.9	2.0	3.2
27	.8	.6	....	2.9	2.5	8.4	2.9	2.2	3.2
28	.8	.8	....	2.9	2.4	8.4	2.9	1.8	2.2
29	.8	1.2	....	2.9	9.5	7.9	2.9	1.8	1.8
30	.8	.8	....	2.9	10	13	2.9	1.8	1.5
31	.7	....	....	....	11	....	2.9	1.8	....

NOTE.—Discharge determined from rating curves as follows: July 17 to Dec. 18, 1914, fairly well defined; Apr. 12 to Aug. 3, 1915, well defined 2 to 18 second-feet; Aug. 4 to Sept. 30, 1915, fairly well defined. Discharge Nov. 23-24 and Dec. 1-18, 1914, estimated on account of ice. No water in ditch Dec. 19, 1914, to Apr. 11, 1915.

Monthly discharge of Conn ditch near Paisley, Oreg., for the period July 17, 1914, to Sept. 30, 1915.

Month.	Discharge in second-feet.			Run-off (total in acre-feet).	Accuracy.
	Maximum.	Minimum.	Mean.		
1914.					
July 17-31	19	11	16.3	484	B.
August	11	5.5	7.96	490	B.
September	8.4	.4	4.56	271	B.
The period	....	....	....	1,240	
1914-15.					
October	1.6	.6	1.02	63	
November	1.2	.3	.61	36	
December	.5	0	.18	11	
January	....	....	0	0	
February	....	....	0	0	
March	....	....	0	0	
April	6.2	0	2.22	132	B.
May	11	1.6	3.91	239	B.
June	17	3.9	10.6	631	B.
July	4.4	2.4	3.22	198	C.
August	4.7	1.8	2.70	166	C.
September	3.2	1.3	2.42	144	B.
The year	17	0	2.24	1,620	

SMALLS CREEK AT PAISLEY, OREG.

Location.—In the SW. ¼ sec. 24, T. 33 S., R. 18 E., in the western part of the town of Paisley, Lake County, just above the road bridge, about 200 yards below point of diversion from Chewaucan River, and about the same distance above the head gate of Bagley ditch.

Records available.—January 18, 1914, to September 30, 1915.

Gage.—Vertical staff on right bank; read daily by Bert Harbor and Richard Guinee. An old gage was used up to June 28, 1914.

Discharge measurements.—Made from highway bridge or by wading.

Channel and control.—A natural stream channel, fairly straight and narrow, with well-defined banks and gravel bed; shifts only at high stages.

Extremes of discharge.—Maximum stage recorded, 2.2 feet May 15, 1914 (discharge, 107 second-feet); minimum stage, 0.4 foot November 11, 1914 (discharge, 0.2 second-foot).

Winter flow.—Stage-discharge relation seriously affected by ice; flow estimated from discharge measurements, observer's notes, and records of temperature.

Accuracy.—Records good except when stream was obstructed by ice, when they are fair.

Cooperation.—Most of the records furnished by Chewacan Land & Cattle Co., W. C. Hammatt, consulting engineer; some measurements and gage readings furnished by Northwest Townsite Co.

Smalls Creek is a natural slough or defluent of Chewaucan River and has been converted into an irrigation canal. It diverts water from the river in the SW. ¼ sec. 24, T. 33 S., R. 18 E., and irrigates 2,417 acres of the alluvial fan of Chewaucan River above the upper marsh, including 1,209 acres watered from Bagley ditch, which takes out a short distance from the river. The irrigation season extends from about April 1 to September 15. Water is diverted at other times for watering stock. Surplus and return waters find their way to the marsh.

Discharge measurements of Smalls Creek at Paisley, Oreg., during the period Jan. 15, 1914, to Sept. 30, 1915.

Date.	Made by—	Gage height.	Discharge.	Date.	Made by—	Gage height.	Discharge.
1914.		*Feet.*	*Sec.-ft.*	1914–15.		*Feet.*	*Sec.-ft.*
Jan. 15	S. A. Musben [a]	[b] 0.55	1.1	Oct. 22	Bert Harber	0.70	2.3
Mar. 13	Bert Harber [a]	.65	6.8	24	.....do	.90	6.6
Apr. 4	Edson and Harber [a]	1.00	18.7	Nov. 22	.....do	[b] .70	2.5
15	Daniels and Moore [c]	.55	5.8	Dec. 19	Arbuckle and Guinee	[b] 1.10	1.1
May 10	Bert Harber	1.50	40.2	Jan. 19	Richard Guinee [a]	[b] 1.50	2.9
14	.....do	1.95	84	Feb. 16	.....do	.75	.6
15	Daniels and Arbuckle	2.15	98	Mar. 20	.....do	.65	3.1
25	Bert Harber	1.70	58	Apr. 23	Guinee and Harber	1.45	34.3
June 1	.....do	1.75	59	May 28	Richard Guinee	1.65	45.0
15	.....do	1.40	36.6	June 21	.....do	1.30	26.6
21	.....do	1.85	72	July 27	.....do	1.10	15.3
July 17	.....do	1.25	21.9	27	W. S. Daniels [c]	1.09	13.2
Aug. 17	.....do	.95	8.8	Aug. 23	Bert Harber	1.05	12.0
Sept. 20	.....do	1.00	9.9	Sept. 26	.....do	1.05	10.4

[a] Employee of Chewacan Land & Cattle Co.

[b] Stage-discharge relation affected by ice.

[c] Employee of Northwest Townsite Co.

Daily discharge, in second-feet, of Smalls Creek at Paisley, Oreg., for the period Jan. 18, 1914, to Sept. 30, 1915.

Day.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.
1914.												
1	......	......	......	......	9.0	10	12	18	61	......	16	8.2
2	......	......	......	......	2.0	9.0	14	18	57	......	19	8.2
3	......	......	......	......	3.0	10	15	20	57	......	16	8.2
4	......	......	......	......	3.8	7.8	18	20	53	......	16	8.2
5	......	......	......	......	3.0	4.6	25	34	49	......	14	8.2
6	......	......	......	......	5.6	6.6	[illegible]	36	49	......	16	8.2
7	......	......	......	......	3.8	4.6	4.6	42	53	......	14	8.2
8	......	......	......	......	3.0	5.6	3.8	49	70	......	12	14
9	......	......	......	......	3.0	5.6	3.8	46	53	......	12	10
10	......	......	......	......	3.0	10	3.8	46	53	......	6.5	8.2
11	......	......	......	......	3.0	4.6	3.8	39	49	......	6.5	8.2
12	......	......	......	......	3.0	6.6	2.5	39	53	......	6.5	8.2
13	......	......	......	......	3.0	7.8	4.6	74	49	......	6.5	8.2
14	......	......	......	......	3.0	9.0	4.6	79	49	......	6.5	8.2
15	......	......	......	......	3.0	9.0	5.6	107	46	......	6.5	10
16	......	......	......	......	3.0	9.0	7.8	61	46	......	6.5	10
17	......	......	......	......	3.0	9.0	14	61	39	22	8.2	16
18	......	......	......	......	4.6	9.0	14	61	36	30	8.2	16
19	......	......	......	......	7.8	9.0	15	61	34	34	8.2	10
20	......	......	......	......	7.8	9.0	9.0	61	70	38	8.2	8.2
21	......	......	......	2.0	9.0	26	7.8	61	65	26	10	8.2
22	......	......	......	4.0	4.6	28	15	61	61	26	10	10
23	......	......	......	6.0	4.6	28	15	57	65	26	8.2	8.2
24	......	......	......	7.8	4.6	26	10	57	74	19	8.2	8.2
25	......	......	......	7.8	3.8	24	5.6	57	84	19	8.2	5.2
26	......	......	......	7.8	4.6	22	4.6	42	70	16	8.2	5.2
27	......	......	......	5.6	4.6	18	3.8	57	74	16	8.2	5.2
28	......	......	......	5.6	4.6	16	14	61	70	16	8.2	5.2
29	......	......	......	5.6	......	15	19	61	70	19	8.2	5.2
30	......	......	......	5.6	......	14	18	59	60	19	8.2	5.2
31	......	......	......	5.6	......	14	......	61	......	19	8.2	......
1914–15.												
1	6.5	5.2	0.9	5.2	5.2	3.2	12	42	53	26	18	10
2	14	5.2	.9	4.0	4.0	3.2	20	42	58	23	16	10
3	8.2	4.0	.9	4.0	3.2	2.5	20	42	49	23	16	10
4	8.2	4.0	.9	8.2	3.2	2.5	16	42	49	23	14	10
5	8.2	3.2	.9	6.5	3.2	2.5	18	42	45	23	12	10
6	8.2	3.2	.9	6.0	1.8	2.5	18	37	45	26	12	10
7	8.2	3.2	.9	5.0	.9	1.9	14	38	45	29	12	10
8	8.2	3.2	.9	5.0	.6	2.5	16	45	45	23	12	10
9	8.2	3.2	.9	4.0	.4	2.5	16	45	45	23	12	10
10	12	2.4	.9	4.0	.2	2.5	18	45	42	20	12	10
11	12	.2	1.2	4.0	.2	7.5	18	53	38	20	12	10
12	4.0	6.5	1.2	3.0	.2	3.2	16	57	38	18	12	12
13	4.0	6.5	1.2	3.0	.6	3.2	16	57	38	18	12	13
14	4.0	6.5	1.2	3.0	.4	6.0	16	57	38	18	12	14
15	4.0	.4	1.2	2.0	.4	6.0	18	55	31	20	14	12
16	4.0	3.2	1.2	2.0	.6	6.0	18	49	31	16	14	12
17	3.2	1.8	1.2	2.0	.9	6.0	22	49	28	14	13	12
18	6.5	2.4	1.2	2.5	1.4	4.0	38	49	28	14	12	11
19	8.2	1.8	1.1	2.9	1.7	5.0	38	51	25	14	13	12
20	12	2.0	1.2	3.2	2.0	3.2	42	45	25	16	14	12
21	8.2	2.2	1.2	6.5	2.5	4.0	42	45	25	16	12	12
22	2.4	2.4	2.4	5.2	2.5	3.2	38	49	26	16	12	10
23	2.4	4.0	4.0	4.0	2.5	3.2	34	49	22	14	12	11
24	2.4	4.0	1.8	4.0	3.2	4.0	42	57	22	16	12	10
25	4.0	3.2	2.4	4.0	2.5	4.0	45	55	22	14	12	12
26	5.2	2.4	3.2	8.2	2.5	5.0	45	53	22	14	12	12
27	5.2	2.4	2.4	6.5	2.5	9.0	49	49	22	14	12	11
28	5.2	1.2	2.4	6.5	3.2	12	49	53	22	14	11	12
29	4.0	.9	3.2	6.5	......	12	53	53	31	16	10	12
30	4.0	.9	4.0	6.5	......	12	49	53	31	17	10	12
31	4.0	......	4.0	5.2	......	12	......	51	......	18	10	......

NOTE.—Discharge determined from well-defined rating curves as follows: Jan. 18 to June 28, July 17 to Nov. 29, 1914; Feb. 21 to June 30, and July 1 to Sept. 30, 1915. Discharge estimated, on account of ice, Jan. 21–23, 27–31, Feb. 2–18, Nov. 20–21, 1914, and Nov. 30, 1914, to Feb. 20, 1915. Mean discharge estimated, Jan. 18–20, 1914, 1 second-foot; July 1–16, 1914, 40 second-feet; and June 28–29, 1914, as in table.

Monthly discharge of Smalls Creek at Paisley, Oreg., for the period Jan. 18, 1914, to Sept. 30, 1915.

Month.	Discharge in second-feet.			Run-off (total in acre-feet).	Accuracy.
	Maximum.	Minimum.	Mean.		
1914.					
January 18-31	7.8	....	4.74	132	C.
February	9.0	2.0	4.31	239	C.
March	28	4.6	12.5	769	B.
April	25	2.5	10.6	631	B.
May	107	18	51.8	3,190	B.
June	84	34	57.3	3,410	B.
July	....	16	31.7	1,950	
August	19	6.5	9.91	609	B.
September	16	5.2	8.61	501	B.
The period	....	....	....	11,400	
1914-15.					
October	14	2.4	6.41	394	B.
November	6.5	.2	3.06	182	B.
December	4.0	.9	1.67	102	
January	8.2	2.0	4.60	283	
February	5.2	.2	1.88	104	
March	12	1.9	5.04	310	C.
April	53	12	28.5	1,700	B.
May	57	37	48.7	3,000	B.
June	53	22	34.5	2,050	B.
July	29	14	18.6	1,140	B.
August	18	10	12.6	775	B.
September	14	10	11.1	660	B.
The year	57	.2	14.8	10,700	

BAGLEY DITCH AT PAISLEY, OREG.

LOCATION.—In the SW ¼ sec. 24, T. 33 S., R. 18 E., just below head gate, in the town of Paisley, Lake County.

RECORDS AVAILABLE.—January 18, 1914, to September 30, 1915.

GAGE.—Vertical staff on left bank; read daily by Bert Harber and Richard Guinee.

DISCHARGE MEASUREMENTS.—Made from plank across ditch at gage or by wading.

CHANNEL AND CONTROL.—Bed composed of earth; control unstable.

EXTREMES OF DISCHARGE.—Maximum stage recorded, 2.5 feet May 15, 1914 (discharge, 68 second-feet); minimum, canal dry at times.

WINTER FLOW.—Stage-discharge relation affected by ice from two to four months each winter. Only a small amount of water is carried during extremely cold weather. Discharge estimated from measurements, observer's notes, and climatic data.

Accuracy.—Records only fair on account of frequent shifts in control.

Cooperation.—Field data furnished by Chewacan Land & Cattle Co., W. C. Hammatt, consulting engineer.

Bagley ditch (sometimes called Brattain ditch) diverts water from Smalls Creek in the SW. ¼ sec. 24, T. 33 S., R. 18 E., a few hundred yards below the point where Smalls Creek diverts from Chewaucan River; extends 6 miles in a southerly direction, and irrigates 1,209 acres lying above the area water by Smalls Creek. Return and waste waters enter upper Chewaucan Marsh. The irrigation season extends from late in March or early in April to about September. Water is diverted for stock throughout the winter.

Discharge measurements of Bagley ditch at Paisley, Oreg., during the period Jan. 15, 1914, to Sept. 30, 1915.

Date.	Made by—	Gage height.	Discharge.	Date.	Made by—	Gage height.	Discharge
1914.		*Feet.*	*Sec.-ft.*	1914–15.		*Feet.*	*Sec.-ft.*
Jan. 15	S. A. Musben	[a] 0.80	0	Oct. 22	Bert Harber	.70	1.8
Mar. 13	Bert Harber	1.10	4.9	Nov. 22	.....do	[a] 1.25	.6
Apr. 4	Edson and Harber	1.65	14.6	Dec. 19	Arbuckle and Guinee	[a] 1.10	.4
May 10	Bert Harber	1.75	30.5	Jan. 19	Richard Guinee	[a] 1.20	.5
14	.....do	2.40	63	Feb. 16	.....do	[a] 1.65	.2
25	.....do	2.20	41.1	Mar. 20	.....do	.75	2.7
June 1	.....do	2.35	54	Apr. 23	Guinee and Harber	1.65	20.2
15	.....do	1.95	33.8	May 28	Richard Guinee	1.95	26.0
21	.....do	2.45	56	June 21	.....do	1.45	13.3
July 26	.....do	1.25	9.6	July 27	.....do	1.55	11.8
Aug. 17	.....do	.90	4.3	Aug. 23	Bert Harber	1.20	8.2
Sept. 20	.....do	.95	4.5	Sept. 20	.....do	1.05	5.9

[a] Stage-discharge relation affected by ice.

Daily discharge, in second-feet, of Bagley ditch at Paisley, Oreg., for the period Jan. 18, 1914, to Sept. 30, 1915.

Day.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.
1914.												
1	......	......	......	......	9.6	1.0	8.8	......	52	......	12	3.4
2	......	......	......	......	.2	1.0	9.6	......	44	......	15	3.4
3	......	......	......	......	.8	3.7	10	......	44	......	8.0	3.4
4	......	......	......	......	1.7	2.2	15	......	42	......	9.0	4.0
5	......	......	......	......	1.5	.8	24	......	42	......	6.2	3.4
6	......	......	......	......	1.5	.8	22	......	39	......	5.3	3.4
7	......	......	......	......	1.5	.6	......	......	42	......	4.6	4.0
8	......	......	......	......	1.5	.8	......	......	56	......	5.3	5.3
9	......	......	......	......	1.0	1.0	......	......	42	......	5.3	6.2
10	......	......	......	......	1.0	4.9	......	31	42	......	4.0	5.3
11	......	......	......	......	1.0	5.6	......	29	42	......	4.0	6.2
12	......	......	......	......	1.0	5.6	......	31	44	......	4.0	6.2
13	......	......	......	......	.5	4.9	......	57	42	......	4.0	6.2
14	......	......	......	......	.5	4.9	......	62	42	......	4.0	7.0
15	......	......	......	......	.5	4.9	......	68	39	......	4.0	7.0
16	......	......	......	......	.1	5.6	......	52	39	......	4.0	15
17	......	......	......	......	2.6	6.4	......	50	30	16	4.0	9.0
18	......	......	......	0.5	2.0	6.4	......	47	28	23	4.0	8.0
19	......	......	......	.5	2.0	6.4	......	46	26	20	4.0	4.6
20	......	......	......	.5	1.7	6.4	......	45	56	25	4.0	5.3
21	......	......	......	1.0	1.0	22	......	44	54	18	4.0	4.0
22	......	......	......	1.5	.4	26	......	43	46	20	4.0	4.0
23	......	......	......	2.0	.4	26	......	42	49	20	4.0	4.0
24	......	......	......	2.5	.3	24	......	42	59	12	5.3	4.0
25	......	......	......	3.7	.2	20	......	42	62	11	6.2	2.3
26	......	......	......	4.9	.3	18	......	32	54	10	7.0	2.3
27	......	......	......	2.6	.3	14	......	49	56	12	7.0	2.3
28	......	......	......	2.6	.6	11	......	54	55	12	7.0	4.6
29	......	......	......	2.6	......	11	......	46	50	11	4.6	2.3
30	......	......	......	2.6	......	9.6	......	46	50	15	4.0	2.3
31	......	......	......	2.6	......	9.6	......	46	......	14	3.4	......
1914–15.												
1	2.3	4.0	0.5	1.1	5.3	1.0	8.0	26	26	21	14	6.0
2	8.0	4.0	.5	.9	5.3	1.0	9.0	25	26	20	13	5.2
3	7.0	4.0	.5	.7	4.6	1.5	9.0	25	26	18	12	5.2
4	4.6	4.0	.5	1.1	4.6	1.0	8.0	25	24	20	10	5.2
5	5.3	2.3	.5	1.8	4.6	1.5	10	25	24	20	9.0	5.2
6	5.3	2.3	.5	1.4	3.4	1.0	10	24	24	21	9.0	5.2
7	5.3	1.8	.5	1.1	2.3	1.0	11	24	26	22	8.0	5.2
8	5.3	1.8	.5	.9	1.1	1.5	11	25	24	21	8.0	5.2
9	6.2	1.8	.5	.5	.7	1.5	12	26	24	21	8.0	6.0
10	9.0	1.8	.5	1.2	.2	1.5	12	26	22	20	8.0	6.0
11	11	.4	.5	1.8	.2	.5	12	28	21	18	7.0	6.0
12	2.8	5.3	.5	1.8	2	1.5	12	30	21	17	8.0	7.0
13	2.8	5.3	.5	1.8	.2	2.0	11	30	20	17	9.0	7.0
14	2.3	2.8	.5	1.8	.2	1.5	11	28	20	20	9.0	8.0
15	2.3	.4	.5	1.8	.2	1.5	9.0	28	17	21	10	7.0
16	1.8	.5	.5	1.8	.2	1.5	8.0	28	17	14	10	6.0
17	1.8	.5	.5	1.8	.5	1.5	19	28	16	14	10	6.0
18	4.6	.5	.5	1.2	.5	2.0	22	28	14	14	10	6.0
19	5.3	.5	.5	.5	.5	3.3	26	28	13	14	10	5.2
20	11	.5	.5	2.8	.5	2.6	24	28	13	17	10	5.2
21	5.3	.5	.5	4.0	1.0	3.3	24	28	13	18	9.0	5.2
22	1.8	.6	1.5	2.8	1.0	2.6	21	31	12	17	8.0	5.2
23	1.8	.6	2.5	2.3	1.0	3.3	20	31	12	16	8.0	5.2
24	1.8	.6	2.5	1.8	1.0	3.3	22	32	13	17	8.0	5.2
25	3.4	.6	1.8	.7	1.0	4.2	24	32	14	16	9.0	5.2
26	4.0	1.8	1.1	.7	.8	4.2	24	32	14	14	9.0	5.2
27	4.0	1.1	1.1	.7	1.0	5.0	25	26	16	13	9.0	5.2
28	4.0	.7	2.3	.7	1.0	5.0	25	26	17	16	8.0	5.2
29	4.0	.6	2.8	.7	......	5.0	26	26	20	14	7.0	5.2
30	4.0	.6	1.8	2.8	......	6.0	26	26	21	14	6.0	5.2
31	4.0	......	1.1	5.3	......	8.0	......	26	......	17	7.0	5.2

NOTE.—Discharge determined from a number of rating curves applicable for short periods, and by indirect method for shifting control. Stage-discharge relation affected by ice, and flow estimated, Jan. 18-[illegible], Feb. 5-15, 18-19, 1914, and Nov. 14, 1914, to Feb. 25, 1915. Mean discharge estimated as 30 second-feet July 1–16, 1914. There was no water in the ditch from Apr. 7 to May 9, 1914.

Monthly discharge of Bagley ditch at Paisley, Oreg., for the period Jan. 18, 1914, to Sept. 30, 1915.

Month.	Discharge in second-feet.			Run-off (total in acre-feet).	Accuracy.
	Maximum.	Minimum.	Mean.		
1914.					
January 18-31	4.9	0.5	2.15	60	
February	9.6	.1	1.28	71	
March	26	.6	8.55	526	B.
April	24	0	2.98	177	B.
May	68	0	32.4	1,990	B.
June	62	26	45.6	2,710	B.
July		10	23.2	1,430	
August	15	3.4	5.52	339	B.
September	15	2.3	4.95	295	B.
The period				7,600	
1914-15.					
October	11	1.8	4.58	282	B.
November	5.3	.4	1.74	104	
December	2.8	.5	.94	58	
January	5.3	.5	1.62	100	
February	5.3	.2	1.54	85	
March	8.0	.5	2.59	159	C.
April	26	8.0	16.4	976	C.
May	32	24	27.5	1,690	C.
June	26	12	19.0	1,130	B.
July	22	13	17.5	1,080	B.
August	14	6.0	9.03	555	B.
September	8.0	5.2	5.66	337	B.
The year	32	.2	9.05	6,560	

JONES-INNIS-ZX DITCH NEAR PAISLEY, OREG.

Location.—In the NW. ¼ sec. 19, T. 33 S., R. 19 E., about 100 yards below the intake, and a mile east of Paisley, Lake County.

Records available.—July 20, 1914, to September 30, 1915.

Gage.—Vertical staff; read daily by Bert Harber and Richard Guinee.

Discharge measurements.—Made by wading.

Channel and control.—Channel excavated in gravel; control fairly permanent. Stage-discharge relation affected at times by growth of aquatic plants.

Extremes of discharge.—Maximum stage recorded, 2.85 feet May 10, 1915 (discharge, 132 second-feet); minimum, canal dry, at stage of about 0.6 foot.

Winter flow.—Stage-discharge relation seriously affected by ice for two or three months each winter; discharge very small.

Accuracy.—Records fair; measurements at high stages in 1915 subject to error; at other times only a small quantity of water for stock was being carried.

Cooperation.—Field data furnished by Chewacan Land & Cattle Co.

Jones-Innis-ZX ditch (so called from the largest water users under it, ZX being the common name of the Chewacan Land & Cattle Co.'s ranch) diverts water from Chewaucan River in the NW. ¼ sec. 19, T. 33 S., R. 19 E., into natural sloughs, from which is irrigated an area of 2,218 acres of the lowest part of the alluvial fan of Chewaucan River immediately above the upper marsh. One of these, Paisley Slough, at its lower end discharges into the "Stock ditch," which is used for irrigation and watering cattle. The irrigating season extends from early in April to September 15, but little water is usually directed after July. Water is diverted practically the entire year for watering stock.

Discharge measurements of Jones-Innis-ZX ditch near Paisley, Oreg., during the period July 20, 1914, to Sept. 30, 1915.

Date.	Made by—	Gage height.	Discharge.	Date.	Made by—	Gage height.	Discharge.
1914.		*Feet.*	*Sec.-ft.*	1915.		*Feet.*	*Sec.-ft.*
Aug. 22	Bert Harber	1.10	2.3	Feb. 16	Richard Guinee	[a]1.05	0.3
Sept. 25	.....do	1.00	.4	Mar. 26	.....do	1.00	([b])
Oct. 22	.....do	1.10	1.5	Apr. 24	Guinee and Harber	2.15	56
Dec. 28	Richard Guinee	[a]1.88	1.2	May 27	Richard Guinee	2.60	103
				June 21	.....do	2.00	52
1915.				Sept. 19	Bert Harber	1.35	8.7
Jan. 20	.....do	[a]1.55	2.1				

[a] Stage-discharge relation affected by ice.
[b] Current too sluggish to move meter.

Daily discharge, in second-feet, of Jones-Innis-ZX ditch near Paisley, Oreg., for the period July 20, 1914, to Sept. 30, 1915.

Day.	July.	Aug.	Sept.	Day.	July.	Aug.	Sept.	Day.	July.	Aug.	Sept.
1914.				1914.				1914.			
1	......	0.6	6.0	11	......	0.3	8.6	21	0.8	1.2	0.3
2	......	.3	8.6	12	......	.6	8.6	22	.8	2.3	.3
3	......	.6	8.6	13	......	.6	7.2	23	.8	2.4	.8
4	......	.8	8.6	14	......	.6	7.2	24	.3	8.6	.6
5	......	.8	8.6	15	......	.6	4.9	25	.2	10	.6
6	......	.8	8.6	16	......	.6	4.9	26	.3	8.6	.3
7	......	.6	9.3	17	......	1.2	.8	27	.6	10	.3
8	......	.8	10	18	......	1.2	.3	28	.6	10	.3
9	......	.6	8.6	19	......	1.2	.3	29	.3	10	.3
10	......	.6	8.6	20	0.8	1.2	.3	30	.6	10	.3
								31	.3	7.2	......

Day.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May.	June.	Aug.	Sept.
1914–15.											
1	0.3	1.2	4.9	......	0.8	1.2	3.0	114	103	......	2.4
2	.3	1.2	4.9	......	.3	1.2	3.0	120	98	......	7.2
3	.3	.8	4.9	......	.3	1.2	4.0	120	92	......	7.2
4	.8	.8	4.0	......	.3	.8	4.0	114	92	......	7.2
5	3.0	.6	3.0	......	1.7	.8	2.4	114	81	......	7.2
6	2.4	.8	2.4	......	2.4	1.2	2.4	103	81	......	7.2
7	1.7	.8	2.4	......	.6	1.2	2.4	103	81	......	6.0
8	1.7	.8	1.7	......	.6	1.2	3.0	92	70	......	6.0
9	1.7	.8	1.7	......	1.2	1.2	3.0	92	70	......	6.0
10	1.7	.8	1.7	......	1.7	1.2	3.0	132	60	......	6.0
11	2.4	.8	.8	......	4.9	1.2	3.0	120	60	......	4.9
12	.8	.8	......	......	7.2	1.2	2.4	120	56	......	8.6
13	1.2	.8	......	......	4.9	1.2	3.0	120	56	......	10
14	.8	.8	......	......	4.0	.8	3.0	114	51	......	10
15	.8	.8	......	......	1.7	.8	2.4	114	51	......	10
16	.8	.8	......	......	1.2	.8	2.4	114	51	......	10
17	.8	.8	......	......	1.2	.8	28	108	46	......	10
18	.8	.8	......	......	1.2	1.2	32	108	46	......	10
19	1.7	.6	......	......	1.2	1.2	38	108	42	3.0	3.0
20	2.4	.6	......	2.1	1.2	1.2	35	108	42	2.7	3.0
21	1.7	.6	......	......	1.2	1.2	38	108	42	2.4	2.4
22	1.5	.6	......	......	1.2	1.2	46	108	42	4.0	2.4
23	1.2	.6	......	......	1.7	1.2	56	108	38	2.4	2.4
24	1.2	.6	......	......	1.2	1.7	56	108	38	6.0	2.4
25	1.2	.6	......	......	1.2	2.4	60	108	38	4.9	3.0
26	.8	7.2	......	......	1.2	1.7	51	108	38	4.0	2.4
27	.8	13	......	......	1.2	2.4	54	103	35	4.0	2.4
28	1.2	8.6	1.2	......	1.2	3.0	56	103	32	3.0	2.4
29	.8	4.9	......	......	......	2.4	120	103	22	3.0	2.4
30	.8	4.9	......	.3	......	2.4	108	103	20	7.2	3.0
31	1.2	......	......	.6	......	2.4	......	103	......	3.0	......

NOTE.—Discharge determined by indirect method for shifting control July 20 to Dec. 11, 1914, and from a well-defined rating curve for other open-channel periods. Discharge estimated on account of ice as follows: 1.0 second-foot, Dec. 12–27 and 29–31; 2.0 second-feet, Jan. 1–19; 1.0 second-foot, Jan. 21–29; Feb. 11–20, as shown in table.

Monthly discharge of Jones-Innis-ZX ditch near Paisley, Oreg., for the period July 20, 1914, to September 30, 1915.

Month.	Discharge in second-feet.			Run-off (total in acre-feet).	Accuracy.
	Maximum.	Minimum.	Mean.		
1914.					
July 20-31	0.8	0.2	0.53	13	
August	10	.3	3.06	188	C.
September	10	.3	4.42	262	C.
The period				463	
1914-15.					
October	3.0	.3	1.25	77	
November	13	.6	1.93	115	
December	4.9	.8	1.70	105	
January		.3	1.61	99	
February	7.2	.3	1.74	96	
March	3.0	.8	1.41	87	
April	120	2.4	27.5	1,640	B.
May	132	92	110	6,760	C.
June	108	20	55.8	3,320	B.
July	0	0	0	0	
August	7.2	0	1.60	98	B.
September	10	2.4	5.57	331	B.
The year	132	0	17.5	12,700	

SILVER LAKE BASIN.

SILVER CREEK NEAR SILVER LAKE, OREG.

LOCATION.—In the SW. ¼ sec. 28, T. 28 S., R. 14 E., at the dam site of the proposed Egli reservoir, 1¼ miles southwest of Silver Lake post office, Lake County, and about 3 miles above mouth of Bridge Creek.

DRAINAGE AREA.—221 square miles.

RECORDS AVAILABLE.—December 29, 1904, to March 31, 1907; January 11, 1909, to September 30, 1915.

GAGE.—Inclined staff on right bank, directly under cable, installed July 24, 1915; read once daily by J. H. Gowdy. Vertical staff on right bank, 10 feet above cable, was used April 5, 1912, to July 23, 1915. An inclined staff at the site of the present gage was used to April 5, 1912, and readings made from it have been reduced to the same datum as far as possible.

DISCHARGE MEASUREMENTS.—Made from cable or by wading.

CHANNEL AND CONTROL.—Bed composed of rocks and gravel; fairly permanent.

EXTREMES OF DISCHARGE.—Maximum stage recorded during year, 1.95 feet March 20 and 21 (discharge, 86 second-feet); the flood crest may have been slightly higher, as gage was read only once daily; minimum stage, 0.15 foot August 7–8 (discharge, 0.8 second-foot).

1905–1907 and 1909–1915: Maximum stage recorded, 6.40 feet at 4 p. m. November 23, 1909 (discharge, 910 second feet); minimum stage, August 7–8, 1915.

WINTER FLOW.—Stage-discharge relation seriously affected by ice in 1915; flow estimated from observer's notes and records of temperature.

DIVERSIONS.—A few small tracts are irrigated above station.

REGULATION.—None.

ACCURACY.—Records good, except for periods in which stage-discharge relation was affected by ice.

Discharge measurements of Silver Creek near Silver Lake, Oreg., during the year ending Sept. 30, 1915.

Date.	Made by—	Gage height.	Discharge.	Date.	Made by—	Gage height.	Discharge.
		Feet.	*Sec.-ft.*			*Feet.*	*Sec.-ft.*
Dec. 13	J. E. Stewart	[a] 0.68	7.8	July 18	P. V. Hodges	0.44	3.3
Mar. 13	P. V. Hodges	.67	13.4	24	.....do	.37	2.7
May 18	.....do	1.17	31.1				

[a] Stage-discharge relation may have been slightly affected by ice.

Daily discharge, in second-feet, of Silver Creek near Silver Lake, Oreg., for the year ending Sept. 30, 1915.

Day.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.
1	13	12	10	10	13	21	78	23	19	11	2.8	1.1
2	13	12	10	10	10	17	70	23	22	9.5	3.0	1.1
3	13	12	10	10	10	13	70	23	21	9.5	2.5	1.1
4	13	12	10	10	10	13	48	21	19	7.4	2.0	1.1
5	13	12	9	8	13	13	55	21	19	7.4	1.5	1.1
6	13	12	8	6	21	13	42	21	16	6.5	1.1	1.1
7	13	12	8	5	23	13	36	21	18	6.5	.8	1.1
8	13	12	8	5	21	13	36	25	20	7.5	.8	1.5
9	12	12	6	5	21	15	30	30	19	5.6	1.1	1.5
10	12	12	7	5	21	13	30	36	20	5.6	1.5	1.5
11	12	12	6	5	21	13	33	36	16	5.0	1.1	1.5
12	13	12	6	5	21	13	30	42	17	5.0	1.1	1.5
13	13	12	7	5	21	13	25	42	15	4.6	1.1	1.5
14	13	12	6	5	21	17	36	36	17	4.6	1.1	1.5
15	13	12	6	5	25	35	42	36	17	4.0	1.1	1.5
16	13	12	6	5	25	47	48	30	15	4.0	1.5	1.5
17	13	12	6	5	25	41	55	30	16	4.0	1.1	1.5
18	13	12	6	5	23	60	70	30	16	4.0	1.5	1.5
19	13	12	6	5	21	76	55	36	15	4.0	1.5	1.5
20	13	12	6	5	21	86	48	36	15	3.4	1.1	1.5
21	13	13	6	5	21	86	48	30	15	3.4	1.5	1.5
22	13	10	6	5	23	78	42	27	16	3.0	1.5	2.0
23	13	12	6	5	25	78	36	27	15	3.0	1.5	2.0
24	13	12	5	5	25	78	30	25	14	2.9	1.5	1.8
25	10	12	5	5	23	70	30	25	13	2.5	1.5	1.8
26	12	12	5	5	25	42	27	25	16	2.5	1.5	1.5
27	12	12	5	5	25	25	27	24	15	2.5	1.1	1.5
28	12	12	6	12	25	48	25	23	13	2.5	1.1	1.5
29	12	12	7	14	......	55	25	23	11	2.5	1.1	1.5
30	12	10	8	16	......	70	25	21	13	3.0	1.1	1.5
31	12	......	9	13	......	70	......	21	......	4.6	1.1	......

NOTE.—Discharge determined from three fairly well defined rating curves, applicable Oct. 1 to Feb. 4, Feb. 6 to Mar. 19, and Mar. 20 to Sept. 30, respectively. Stage-discharge relation affected by ice Dec. 14 to Feb. 5; flow estimated as in table.

Monthly discharge of Silver Creek near Silver Lake, Oreg., for the year ending Sept. 30, 1915.

Month.	Discharge in second-feet.			Run-off (total in acre-feet).	Accuracy.
	Maximum.	Minimum.	Mean.		
October	13	12	12.6	775	B.
November	13	10	11.9	708	B.
December	10	5	6.9	424	C.
January	16	5	6.9	424	D.
February	25	10	20.7	1,150	B.
March	86	13	40.2	2,470	B.
April	78	25	41.7	2,480	B.
May	42	21	28.0	1,720	B.
June	22	11	16.4	976	B.
July	11	2.5	4.85	298	B.
August	3.0	.8	1.41	87	B.
September	2.0	1.1	1.46	87	B.
The year	86	.8	16.0	11,600	

SILVER LAKE NEAR SILVER LAKE, OREG.

Location.—In lot 3, sec. 11, T. 29 S., R. 15 E., on the west shore of the lake, a mile south of the Duncan place, and 9 miles from Silver Lake, Lake County.

Records available.—Occasional readings 1905–1915.

Gage.—Vertical staff bolted to large boulder, used in 1905 and 1906. Since then the water surface has been referred to the bench mark. Datum of gage, 4,425.54 feet above sea level, according to surveys by the Oregon Eastern Railroad and United States Reclamation Service.

Extremes of stage.—Maximum stage during recent years, 16.5 feet in spring of 1904 (determined from high-water marks); minimum since gage was established, 7.55 feet October 3, 1915; lake bed was dry in 1889.

Elevation, in feet, of Silver Lake near Silver Lake, Oreg.

1914.		1915.	
Aug. 2	11.15	July 19	8.58
Nov. 2	9.96	22	8.55
		Oct. 3	7.55

MALHEUR AND HARNEY LAKES BASINS.

SILVIES RIVER NEAR BURNS, OREG.

Location.—In the SW. ¼ sec. 31, T. 21 S., R. 30 E., about a mile above Sylvester's ranch, and 12 miles northwest of Burns, Harney County.

Drainage.—940 square miles (measured on special maps issued by United States Reclamation Service in 1915).

Records available.—May 10, 1903, to July 24, 1906; December 14, 1908, to September 30, 1915 (fragmentary).

Gage.—Gurley water-stage recorder on left bank, installed December, 1911. Prior to December, 1911, station was about 1¼ miles downstream, at wagon bridge near Parker's house, in sec. 7, T. 22 S., R. 30 E.

Discharge measurements.—Made from cable about one-fourth mile below gage or by wading.

Channel and control.—Control is a gravel riffle about 25 feet below gage; probably shifts in high water. Above gage heights of 13 feet river overflows a wide area. During low water the stage-discharge relation is affected by backwater from a diversion dam.

Extremes of discharge.—Maximum gage height from water-stage recorder, 9.36 feet, 3.15 to 7.30 p. m. April 4 (discharge, 607 second-feet); no record of minimum.

1904–1906 and 1909–1915: Maximum stage recorded, 17.12 feet April 15, 1904 (discharge, 4,730 second-feet); minimum stage, 2.2 feet September 9–12, 1903 (discharge, 3 second-feet).

Winter flow.—Stage-discharge relation not seriously affected by ice.

Diversions.—A large area of land in the headwaters of Silvies River is irrigated with flood water.

Regulation.—None.

Accuracy.—Records for high water good, but no reliable low-water records have been obtained since about 1911.

The following measurement was made by H. K. Donnelly, assistant to the State engineer of Oregon:

April 16: Gage height, 6.23 feet; discharge, 303 second-feet.

Daily discharge, in second-feet, of Silvies River near Burns, Oreg., for the year ending Sept. 30, 1915.

Day.	Oct.	Nov.	Mar.	Apr.	May.	June.	Day.	Oct.	Nov.	Mar.	Apr.	May.	June.
1	......	40	......	428	178	......	16	......	......	......	288	213	......
2	......	39	......	438	203	......	17	......	......	......	263	203	......
3	......	39	......	518	218	......	18	......	......	......	248	188	......
4	......	38	......	601	208	......	19	......	......	......	238	178	......
5	......	38	......	591	228	......	20	......	......	......	213	168	......
6	......	38		549	223	......	21	......	......	......	148	158	......
7	......	38	......	498	183	......	22	......	......	......	123	148	......
8	......	......	62	448	158	......	23	......	......	......	133	148	......
9	......	......	63	408	168	58	24	......	......	......	128	148	......
10	......	......	71	378	203	......	25	......	......	......	133	148	......
11	......	......	......	368	228	......	26	......	......	......	128	143	......
12	......	......	......	368	238	......	27	......	......	......	118	143	......
13	......	......	......	358	228	......	28	......	......	......	123	143	......
14	......	......	......	338	218	......	29	......	......	468	138	133	......
15	......	......	118	308	213		30	......	......	468	148	133	......
							31	40	......	468	......	130	......

NOTE.—Discharge determined from well-defined rating curve. Discharge May 23 and 24 interpolated. Mean discharge Mar. 11–14 estimated, 90 second-feet; Mar. 16–28, 250 second-feet. Total run-off, Mar. 8–31, 10,600 acre-feet; Apr. 1–30, 18,200 acre-feet; May 1–31, 11,100 acre-feet

DONNER UND BLITZEN RIVER NEAR DIAMOND, OREG.

LOCATION.—In the SW. ¼ sec. 8, T. 32 S., R. 32½ E., at mouth of canyon, on the P ranch, 1½ miles above the ranch buildings, about 25 miles southwest of Diamond, Harney County, and 40 miles above Narrows, Harney County.

DRAINAGE AREA.—200 square miles (measured on special maps prepared by Garfield Stubblefield).

RECORDS AVAILABLE.—May 22, 1910, to September 30, 1915; also January 26, 1909, to July 31, 1910, and November 1–12, 1910, at station below several diversion ditches.

GAGE.—Vertical staff on left bank; read daily during high water March 30 to August 14, and weekly at other times, by Jesus Achurra; original gage was a vertical staff on right bank just below wagon bridge near ranch building.

DISCHARGE MEASUREMENTS.—Made from a cable 75 yards above gage or by wading.

CHANNEL AND CONTROL.—Bed composed of gravel and sand; one channel at all stages. Banks covered with dense growth of willows and underbrush; subject to overflow at flood stages. Gage has been raised considerably since 1913, but was not checked with level until 1916. Gage readings used as read.

EXTREMES OF DISCHARGE.—Maximum stage recorded during year, 6.4 feet at 7.30 p. m. May 3 (discharge, 2,060 second-feet); minimum stage, 1.8 feet December 18 to February 6 (discharge, 26 second-feet).

1909–1915: Maximum and minimum occurred in 1915.

WINTER FLOW.—Stage-discharge relation not seriously affected by ice; open-channel rating curve assumed applicable.

DIVERSIONS.—Present gage is above all irrigation ditches.

REGULATION.—None.

ACCURACY.—Records fair. During the spring river is subject to considerable diurnal fluctuations and much of the water from the melting snow may pass the station at night, when no record would be obtained.

COOPERATION.—Field data furnished by the Blitzen Valley Land Co.

Discharge measurements of Donner und Blitzen River near Diamond, Oreg., during the year ending Sept. 30, 1915.

[Made by A. H. Page.]

Date.	Gage height.	Discharge.	Date.	Gage height.	Discharge.
	Feet.	*Sec.-ft.*		*Feet.*	*Sec.-ft.*
May 3	2.65	271	July 18	1.60	34.5
June 17	2.53	275			

Daily discharge, in second-feet, of Donner und Blitzen River near Diamond, Oreg., for the year ending Sept. 30, 1915.

Day.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.
1	58	58				32	75	130	270	118	42	
2				26		32	85	142	270	118	42	
3						32	95	1,070	240	130	42	
4						32	95	490	225	130	42	42
5			32			32	85	470	210	130	42	
6					26	32	85	795	255	130	42	
7		58				34	95	682	322	168	42	
8	58					35	95	660	305	168	42	
9				26		37	95	570	305	155	42	
10						39	95	660	340	143	42	
11						40	105	1,270	270	130	42	42
12			32			42	118	1,440	210	118	42	
13					32	44	118	1,400	155	118	42	
14		58				44	118	1,120	168	118	35	
15	58					44	105	1,070	180	118	35	
16				26		44	105	885	210	105	35	
17						44	130	750	210	95	35	
18						44	142	750	210	85	35	42
19			26			44	155	682	210	75	35	
20					32	44	168	638	195	65	35	
21	65	37				44	220	615	180	65	35	
22						44	168	570	168	65	35	
23				26		44	105	490	155	65	35	
24						44	85	470	143	65	35	
25						44	85	450	105	65	35	42
26			26			44	85	358	105	58	35	
27					32	44	118	340	105	50	35	
28	65	37				51	168	305	105	50	35	
29						58	142	288	105	50	35	
30				26		65	130	288	105	50	36	
31						75		270		50	37	

NOTE.—Discharge Oct. 1 to May 2 determined from poorly defined rating curve; May 3 to Sept. 30 from fairly well defined rating curve. Discharge interpolated for days in March and August when gage was not read.

Monthly discharge of Donner und Blitzen River near Diamond, Oreg., for the year ending Sept. 30, 1915.

Month.	Discharge in second-feet.			Run-off total (in acre-feet).	Accuracy.
	Maximum.	Minimum.	Mean.		
October			60.8	3,740	C.
November			49.6	2,950	D.
December			29.5	1,810	D.
January			26.0	1,600	D.
February			30.5	1,690	D.
March	75	32	42.8	2,630	D.
April	220	75	116	6,900	C.
May	1,440	130	649	39,900	C.
June	340	105	201	12,000	B.
July	168	50	98.4	6,050	B.
August	42	35	38.0	2,340	B.
September	42	42	42.0	2,500	B.
The year	1,440		116	84,100	

DONNER UND BLITZEN RIVER NEAR NARROWS, OREG.

Location.—In the NE. ¼ sec. 26, T. 29 S., R. 31 E., at the "grain camp," at bridge immediately below the intake of the Buena Vista canal, 2 or 3 miles above the mouth of Keiger Creek, and about 25 miles south of Narrows, Harney County.

Drainage area.—Not measured.

Records available.—March 21 to July 31, 1915, when records were suspended because no observer was available.

Gage.—Vertical staff on west abutment of bridge; read once daily by W. F. Edwards.

Discharge measurements.—Made from cable about 70 feet below gage.

Channel and control.—Artificial channel, excavated in clayey material. Banks fairly even and not subject to overflow; control not defined.

Extremes of discharge.—Maximum stage recorded during year, 5.2 feet May 16 (discharge, 392 second-feet); minimum stage recorded, 1.7 feet April 16 (discharge, 17 second-feet).

Winter flow.—No records during period when stream was frozen.

Diversions.—In addition to the Buena Vista canal and a small ditch taking out from river just above gage, 14,000 acres of the P ranch lands are irrigated by spring flooding from the river and its tributaries. (See p. 239 for records on Buena Vista canal.)

Regulation.—The diversion dam above the gage backs the water up 4 or 5 miles, and the pondage thus created may affect materially the discharge of a day or two.

Accuracy.—Records good; rating curve excellent, but gage readings may not give accurately the mean for a day or even for a week.

Cooperation.—Field data furnished by Blitzen Valley Land Co.

Discharge measurements of Donner und Blitzen River near Narrows, Oreg., during the year ending Sept. 30, 1915.

[Made by A. H. Page.]

Date.	Gage height.	Discharge.	Date.	Gage height.	Discharge.
	Feet.	*Sec.-ft.*		*Feet.*	*Sec.-ft.*
Apr. 26	2.52	69	June 21	3.87	166
May 7	4.63	268	Aug. 23	1.82	32.9
June 10	4.48	245			

Daily discharge, in second-feet, of Donner und Blitzen River near Narrows, Oreg., for the year ending Sept. 30, 1915.

Day.	Mar.	Apr.	May.	June.	July.	Day.	Mar.	Apr.	May.	June.	July.
1		87	99	247	57	16		27	392	203	75
2		93	106	217	63	17		32	180	180	63
3		93	113	344	69	18		37	191	170	57
4		87	127	300	69	19		75	203	170	52
5		93	180	247	63	20		52	217	170	52
6		87	300	170	151	21	87	57	203	160	47
7		87	300	203	127	22	99	63	191	160	47
8		69	217	232	120	23	81	57	180	151	42
9		75	160	232	120	24	87	52	180	63	42
10		69	165	217	113	25	93	47	180	63	42
11		69	170	232	106	26	87	57	170	63	47
12		75	180	191	99	27	81	57	160	57	47
13		69	203	281	93	28	75	75	160	57	52
14		69	300	247	93	29	87	75	170	63	52
15		63	344	217	87	30	81	99	180	63	57
						31	93		203		57

Note.—Discharge determined from a well-defined rating curve. Results June 24 to July 5 may be in error, or the Buena Vista canal may have been diverting some water, but the more probable explanation of the decrease in discharge is that water was turned into one or more of the ditches on the R ranch at the beginning and turned out at the end of the period.

Monthly discharge of Donner und Blitzen River near Narrows, Oreg., for the year ending Sept. 30, 1915.

Month.	Discharge in second-feet.			Run-off (total in acre-feet).	Accuracy.
	Maximum.	Minimum.	Mean.		
March 21-31	99	75	86.5	1,890	B.
April	99	27	68.2	4,060	B.
May	392	99	198	12,200	B.
June	344	57	179	10,700	B.
July	151	42	72.9	4,480	B.
The period				33,300	

Combined discharge of Donner und Blitzen River and Buena Vista canal near Narrows, Oreg., for the year ending Sept. 30, 1915.

Month.	Discharge in second-feet.			Run-off (total in acre-feet).
	Maximum.	Minimum.	Mean.	
March 21-31	147	81	101	2,210
April	169	95	117	6,960
May	479	179	283	17,400
June	344	57	186	11,100
July	151	42	72.9	4,480
The period				42,200

NOTE.—See p. 239 for records of Buena Vista canal near Narrows, Oreg.

MUD CREEK NEAR DIAMOND, OREG.

LOCATION.—In sec. 4, T. 32 S., R. 32½ E., one-fourth mile east of the ranch field, about 2 miles east of the P ranch buildings, and about 23 miles southwest of Diamond, Harney County.

DRAINAGE AREA.—30 square miles (measured on special maps prepared by Garfield Stubblefield).

RECORDS AVAILABLE.—March 18, 1911, to September 30, 1915.

GAGE.—Vertical staff driven into bed of creek on left bank; read once daily October 1-10, March 26 to August 14, and once or twice a week for rest of year, by Jesus Achurra.

DISCHARGE MEASUREMENTS.—Made from footbridge near gage or by wading.

CHANNEL AND CONTROL.—Bed composed of clean sand; shifting. Control not defined.

EXTREMES OF DISCHARGE.—Maximum stage recorded during year, 5.65 feet at 6.30 p. m. May 3 (discharge estimated from extension of rating curve as 154 second-feet); minimum stage, 1.3 feet August 21 and 28, 1915 (discharge, 0.1 second-foot).

1911-1915: Maximum and minimum occurred in 1915.

WINTER FLOW.—Stage-discharge relation apparently not affected by ice.

DIVERSIONS.—None above station.

REGULATION.—None.

ACCURACY.—Records are poor, but are valuable in conjunction with those on Donner und Blitzen River and Bridge Creek, in showing the total run-off above the mouth of Kelger Creek.

COOPERATION.—Field data furnished by Blitzen Valley Land Co.

Discharge measurements of Mud Creek near Diamond, Oreg., during the year ending Sept. 30, 1915.

[Made by A. H. Page.]

Date.	Gage height.	Discharge.	Date.	Gage height.	Discharge.
	Feet.	*Sec.-ft.*		*Feet.*	*Sec.-ft.*
May 3	2.67	17.5	July 19	1.30	0.1
June 19	1.89	6.0			

Daily discharge, in second-feet, of Mud Creek near Diamond, Oreg., for the year ending Sept. 30, 1915.

Day.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.
1	0.6		0.8			0.6	1.7	7.8	10.2	3.3	0.1	
2	.6	0.8	.8	0.4	0.4	.6	1.7	8.7	10.2	3.3	.1	
3	.6					.6	2.8	70	7.4	3.3	.1	
4	.6					.6	2.8	21	7.4	3.3	.1	0.1
5	.6			.4		.6	2.8	21	8.0	3.3	.1	
6	.6		.4			.6	2.8	22	8.8	3.3	.1	
7	.6	.8				.6	2.8	21	8.8	3.3	.1	
8	.8	.8				.6	2.3	21	8.0	3.3	.1	
9	.8				.4	.6	2.8	21	8.0	3.3	.1	
10	.8			.4		.6	2.8	24	7.7	3.3	.1	
11	.8	.8	.4			.6	2.8	80	7.4	3.3	.1	.1
12	.8					.6	3.2	88	7.4	2.8	.1	
13	.8		.4			.6	3.2	60	6.7	2.8	.1	
14	.8	.8				.6	3.2	47	6.7	2.4	.1	
15	.8	.8			.4	.6	3.2	39	6.7	2.4	.1	
16	.8			.4		.6	3.2	30	6.7	1.6	.1	
17	.8					.6	3.2	24	7.4	1.6	.1	
18	.8					.6	3.2	23	6.7	1.2	.1	.2
19	.8		.4	.4		.6	3.2	22	6.0	1.2	.1	
20	.8	.8	.4			.6	4.2	19	6.0	.8	.1	
21	.8					.7	4.2	19	5.4	.8	.1	
22	.8	.8			.4	.8	4.8	18	5.4	.8	.1	
23	.8					.8	4.2	18	5.4	.8	.1	
24	.8					.9	3.7	17	5.4	.8	.1	
25	.8		.4	.4		1.0	3.2	16	4.8	.8	.1	.2
26	.8					1.0	3.2	12	4.8	.4	.1	
27	.8					1.2	3.2	12	4.3	.4	.1	
28	.8	.8	.4		.4	1.2	3.7	11	3.8	.4	.1	
29	.8	.8		.4		1.4	4.2	11	3.3	.1	.1	
30	.8					1.7	6.2	10.2	3.3	.1	.1	
31	.8					1.7		10.2		.1	.1	

NOTE.—Discharge Oct. 1 to May 2 determined from a poorly defined rating curve; May 3 to Sept. 30, from a fairly well defined rating curve. Discharge interpolated for days in October, March, and August, when gage was not read.

Monthly discharge of Mud Creek near Diamond, Oreg., for the year ending Sept. 30, 1915.

Month.	Discharge in second-feet.			Run-off (total in acre-feet).	Accuracy.
	Maximum.	Minimum.	Mean.		
October	0.8	0.6	0.75	46	D.
November			.80	48	D.
December			.49	30	D.
January			.40	25	D.
February			.40	22	D.
March	1.7	.6	.79	49	D.
April	6.2	1.7	3.28	195	D.
May	88	7.8	26.6	1,640	C.
June	10.2	3.3	6.60	393	C.
July	3.3	.1	1.89	116	C.
August	.1	.1	.10	6	D.
September			.15	9	D.
The year			3.56	2,580	

BRIDGE CREEK NEAR DIAMOND, OREG.

Location.—In sec. 34, T. 31 S., R. 32½ E., one-fourth mile east of the ranch field, about 4 miles northeast of the P ranch buildings, and about 20 miles southwest of Diamond, Harney County.

Drainage area.—35 square miles (measured on map of United States Reclamation Service).

Records available.—March 18 to August 31, 1911; January 1, 1912, to September 30, 1915.

Gage.—Vertical staff on left bank; read daily April 1 to August 14, and weekly at other times, by Jesus Achurra.

Discharge measurements.—Made from footbridge near gage.

Channel and control.—Bed composed of alluvium and clay; shifts slightly. One channel; banks not subject to overflow.

Extremes of discharge.—Maximum stage recorded during year, 4.85 feet at 6 p. m. May 3 (discharge, 166 second-feet); minimum stage, 1.6 feet January 2 to April 27 (discharge, 8 second-feet).

1911–1915: Maximum stage recorded, 4.85 feet May 3, 1915 (discharge, 166 second-feet); minimum discharge, 7 second-feet (gage height, 1.85 feet), February 24 and 25, 1912.

Winter flow.—Stage-discharge relation not affected by ice on account of large volume of flow from springs.

Diversions.—None above station.

Regulation.—None.

Accuracy.—Records for 1915 good.

Cooperation.—Field data furnished by Blitzen Valley Land Co.

Discharge measurements of Bridge Creek near Diamond, Oreg., during the year ending Sept. 30, 1915.

[Made by A. H. Page.]

Date.	Gage height.	Discharge.	Date.	Gage height.	Discharge.
	Feet.	*Sec.-ft.*		*Feet.*	*Sec.-ft.*
May 3	1.88	17.0	July 19	1.68	10.6
June 19	1.66	9.6			

Daily discharge, in second-feet, of Bridge Creek near Diamond, Oreg., for the year ending Sept. 30, 1915.

Day.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.
1	12	12					8	11	11	10	10	
2				8			8	14	11	10	10	
3							8	80	11	10	10	
4							8	29	11	10	10	10
5			12				8	23	11	10	10	
6					8	8	8	19	11	10	10	
7		12					8	14	11	10	10	
8	12						8	14	11	10	10	
9				8			8	12	11	10	10	
10							8	14	11	10	10	
11							8	27	11	10	10	10
12			11				8	29	11	10	10	
13					8	8	8	25	11	10	10	
14		12					8	23	11	10	10	
15	12						8	21	11	10	10	
16				8			8	17	11	10	10	
17							8	16	11	10	10	
18							8	14	11	10	10	10
19			10				8	14	11	10	10	
20					8	8	8	12	11	10	10	
21	12	12					8	11	11	10	10	
22							8	11	11	10	10	
23				8			8	11	11	10	10	
24							8	11	10	10	10	
25							8	11	10	10	10	10
26			10				8	11	10	10	10	
27					8	8	8	11	10	10	10	
28	12	12					10	11	10	10	10	
29							10	11	10	10	10	
30				8			10	11	10	10	10	
31								11		10	10	

NOTE.—Discharge determined from well-defined rating curve; interpolated for days in August when gage was not read.

Monthly discharge of Bridge Creek near Diamond, Oreg., for the year ending Sept. 30, 1915.

Month.	Discharge in second feet.			Run-off total (in acre-feet).	Accuracy.
	Maximum.	Minimum.	Mean.		
October			12.0	738	B.
November			12.0	714	B.
December			10.8	664	B.
January			8.0	492	B.
February			8.0	444	B.
March			8.0	492	B.
April	10	8	8.2	488	B.
May	80	11	17.7	1,090	B.
June	11	10	10.8	643	B.
July	10	10	10.0	615	B.
August			10.0	615	B.
September			10.0	595	B.
The year	80		10.5	7,590	

BUENA VISTA CANAL NEAR NARROWS, OREG.

LOCATION.—In the NE. ¼ sec. 26, T. 29 S., R. 31 E., at bridge over canal, 300 feet below intake, and opposite station on Donner und Blitzen River at the "grain camp," about 25 miles south of Narrows, Harney County.

RECORDS AVAILABLE.—March 25 to June 7, 1915.

GAGE.—Vertical staff on pier of bridge; read once daily by W. F. Edwards.

DISCHARGE MEASUREMENTS.—Made from bridge.

CHANNEL AND CONTROL.—Canal is about 4 feet deep, excavated in a clayey material. A dam across canal about one-fourth mile below gage acts as control, but this is not disturbed during the irrigating season.

Extremes of discharge.—Maximum stage recorded during year, 4.6 feet May 14 (discharge, 179 second-feet). Canal dry at times.

Winter flow.—Water turned out during extremely cold weather.

Accuracy.—A curve, based on measurements made in 1915 and 1916, has been obtained, and records are fair.

Cooperation.—Field data furnished by Blitzen Valley Land Co.

This canal diverts water from left bank of Donner und Blitzen River, in the NE. ¼ sec. 26, T. 29 S., R. 31 E., to irrigate marsh hay lands on west side of Donner und Blitzen River.

The following discharge measurement was made by A. H. Page:

May 7, 1915: Gage height, 3.47 feet (discharge, 91.1 second-feet).

Daily discharge, in second-feet, of Buena Vista canal near Narrows, Oreg., for the year ending Sept. 30, 1915.

Day.	Mar.	Apr.	May.	June.	Day.	Mar.	Apr.	May.	June.
1		21	80	87	16		108	80	
2		17	80	80	17		108	73	
3		25	87	0	18		101	73	
4		21	87	0	19		94	80	
5		17	94	0	20		60	87	
6		25	115	33	21		60	87	
7		21	108	17	22		60	80	
8		33	73		23		60	73	
9		38	73		24		60	66	
10		29	87		25	54	54	66	
11		43	87		26	43	43	60	
12		48	101		27	4	38	60	
13		43	131		28	13	43	60	
14		43	179		29	17	48	60	
15		29	108		30	13	73	66	
					31	17		80	

Note.—Discharge determined from a rating curve fairly well defined between 40 and 120 second-feet based largely on measurements made in 1916. Water turned into canal Mar. 25 and shut off on June 7.

Monthly discharge of Buena Vista canal near Narrows, Oreg., for the year ending Sept. 30, 1915.

Month.	Discharge in second-feet.			Run-off (total in acre-feet).	Accuracy.
	Maximum.	Minimum.	Mean.		
March 25-31	54	4	23.0	319	C.
April	108	17	48.8	2,900	C.
May	179	60	85.2	5,240	B.
June 1-7	87	0	31.0	430	C.
The period				8,890	

SILVER CREEK ABOVE RILEY, OREG.

Location.—In the NW. ¼ sec. 30, T. 22 S., R. 26 E at Cecil ranch, 3 miles below junction of Nichols Creek, and about 12 miles above Riley, Harney County.

Drainage area.—260 square miles (measured on maps of United States Reclamation Service).

Records available.—April 19, 1904, to July 14, 1906; February 16 to December 12, 1909; April 6 to October 19, 1910; and flood periods 1911, 1912, 1914, and 1915.

Gage.—Vertical and inclined staff on right bank, one-fourth mile above Cecil ranch house and 100 yards above point where creek divides into three channels, installed December 5, 1910; read once daily, and high water during the nights noted by Glen Garret. Original gage, read 1904 to 1906, was attached to timbers on left downstream side of bridge over left or main channel, at the ranch buildings where creek is divided into three channels. A second gage, 100 yards upstream from bridge, was installed January 14, 1909, and read until October 19, 1910.

Discharge measurements.—Made from cable about 100 yards below gage.

Channel and control.—Bed composed of clean gravel; not likely to shift.

Extremes of discharge.—Maximum stage recorded during year, 6.0 feet night of April 3, observed from high-water marks the next morning (discharge, 610 second-feet). Stream goes practically dry each year at about zero gage height.

1904–1906 and 1909–1915: Maximum stage recorded, 13.95 feet on original gage, observed from high-water mark April 14, 1904 (discharge, 1,760 second-feet).

Winter flow.—Stage-discharge relation seriously affected by ice; no records during winter in recent years, as stream is practically dry.

Diversions.—Practically no land irrigated above station.

Regulation.—None.

Accuracy.—High-water part of rating curve is subject to error, as no measurements were made in 1915 above low water; results fair.

The following measurement was made by R. D. Cooper:

April 27, 1915: Gage height, 1.20 feet; discharge, 42.8 second-feet.

Daily discharge, in second-feet, of Silver Creek above Riley, Oreg., for the period Mar. 14 to May 5, 1915.

Day.	Mar.	Apr.	May.	Day.	Mar.	Apr.	May.	Day.	Mar.	Apr.	May.
1		402	49	11		207		21	62	73	
2		389	49	12		194		22	85	66	
3		441	43	13		134		23	122	62	
4		558	43	14	23	98		24	194	66	
5		480	37	15	23	85		25	194	55	
6		376		16	19	90		26	170	52	
7		350		17	30	85		27	170	49	
8		324		18	52	90		28	337	46	
9		233		19	23	81		29	519	43	
10		220		20	32	77		30	428	43	
								31	402		

Note.—Discharge determined from a fairly well defined rating curve.

Monthly discharge of Silver Creek above Riley, Oreg., for the period Mar. 14 to May 5, 1915.

Month.	Discharge in second-feet.			Run-off (total in acre-feet).	Accuracy.
	Maximum.	Minimum.	Mean.		
March 14–31	519	19	160	5,710	C.
April	558	43	182	10,800	C.
May 1–5	49	37	44.2	438	B.
The period				16,900	

Note.—The run-off during period not covered by records was probably less than 1,000 acre-feet.

CATLOW VALLEY DRAINAGE BASIN.

HOME CREEK NEAR BECKLEY, OREG.[1]

Location.—In the NE. ¼ sec. 10, T. 35 S., R. 32 E., at the mouth of canyon, half a mile above Home Creek ranch buildings, 12 miles southeast of Beckley, and about 60 miles south of Narrows, Harney County.

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[1] Published in Water-Supply Paper 310, 1911, as Home Creek near Narrows, Oreg.

Drainage area.—Not measured.

Records available.—April 21 to July 31, 1911; February 10 to July 31, 1912; April 1 to June 30, 1915.

Gage.—Vertical staff on left bank; read once daily by Judd Wise. A similar staff at practically the same site but different datum was used in 1911 and 1912.

Discharge measurements.—Made from foot plank near gage or by wading.

Channel and control.—Bed composed of heavy gravel and boulders; may shift in extreme floods.

Extremes of discharge.—Maximum stage recorded during year, 4.0 feet May 5 (discharge, 165 second-feet). The measurement of January 16, 1.0 second-foot, probably represents the smallest flow that this station ever reaches.

1911–12 and 1915: Maximum stage recorded, 4.7 feet, on old gage, April 27, 1912 (discharge, 330 second-feet); minimum discharge, 1.0 second-foot January 16, 1915.

Winter flow.—Creek freezes solid and water overflows the ice in severe winter.

Diversions.—None above station; most of the water of the creek is used for flood irrigation on the hay lands of the Home Creek ranch.

Regulation.—None.

Accuracy.—Records fair; probably considerable diurnal fluctuation in the spring; records for 1912 are subject to error, as no measurements were made during that year.

Cooperation.—Field data furnished by Blitzen Valley Land Co.

Discharge measurements of Home Creek near Beckley, Oreg., during the year ending Sept. 30, 1915.

[Made by A. H. Page.]

Date.	Gage height.	Discharge.	Date.	Gage height.	Discharge.
	Feet.	*Sec.-ft.*		*Feet.*	*Sec.-ft.*
Jan. 16	1.84	1.0	May 27	2.42	16.0
May 4	3.80	141	July 18	1.85	2.4
6	2.80	40.9			

Daily discharge, in second-feet, of Home Creek near Beckley, Oreg., for the periods Feb. 10 to July 31, 1912, and Apr. 1 to June 30, 1915.

Day.	Feb.	Mar.	Apr.	May.	June.	July.	Day.	Feb.	Mar.	Apr.	May.	June.	July.
1912.							1912.						
1	......	4.0	102	124	53	6.0	16	14	4.0	44	147	23	4.0
2	......	4.0	210	113	62	4.0	17	36	4.0	53	225	29	1.5
3	......	2.5	240	171	53	1.5	18	62	4.0	36	171	23	6.0
4	......	1.5	135	159	53	4.0	19	53	6.0	53	210	44	4.0
5	......	1.5	113	171	53	2.5	20	14	8.0	36	159	23	1.5
6	......	1.0	124	159	62	4.0	21	11	6.0	53	183	29	4.0
7	......	1.5	225	183	29	1.5	22	8.0	11	62	171	23	2.5
8	......	2.5	147	171	53	6.0	23	6.0	4.0	147	71	44	1.5
9	......	4.0	265	196	36	1.0	24	4.0	29	91	53	23	4.0
10	2.5	4.0	171	147	44	6.0	25	4.0	14	196	147	23	4.0
11	4.0	4.0	159	159	29	4.0	26	4.0	18	310	62	14	1.5
12	2.5	6.0	135	135	36	4.0	27	4.0	91	330	53	18	4.0
13	6.0	4.0	62	183	23	1.5	28	4.0	124	210	44	16	2.5
14	4.0	4.0	29	159	44	8.0	29	4.0	91	124	159	14	1.5
15	8.0	2.5	53	171	23	2.5	30	......	71	113	44	18	2.5
							31	......	124	......	53	......	4.0

Daily discharge, in second-feet, of Home Creek near Beckley, Oreg., for the periods Feb. 10 to July 31, 1912, and Apr. 1 to June 30, 1915—Continued.

Day.	Apr.	May.	June.	Day.	Apr.	May.	June.	Day.	Apr.	May.	June.
1915.				1915.				1915.			
1	47	20	6	11	......	81	......	21	29	39	......
2	39	32	......	12	......	112	......	22	23	26	......
3	39	32	......	13	......	56	8	23	26	26	6
4	32	39	8	14	......	56	......	24	18	26	......
5	56	96	......	15	......	47	......	25	15	20	......
6	52	47	......	16	43	47	11	26	18	20	6
7	66	26	6	17	36	66	......	27	15	20	......
8	39	43	......	18	32	56	8	28	20	15	......
9	43	47	......	19	32	56	......	29	20	11	6
10	47	56	6	20	29	47	8	30	15	11	6
								31	......	8	......

NOTE.—Discharge determined from fairly well defined rating curves. Curve for 1912 is same as that for 1911 at low water, and extended parallel to the curve for 1915 to high water. Mean discharge Apr. 11-15, 1915, estimated at 50 second-feet.

Monthly discharge of Home Creek near Beckley, Oreg., for the periods Feb. 10 to July 31, 1912, and Apr. 1 to June 30, 1915.

Month.	Discharge in second-feet.			Run-off (total in acre-feet).	Accuracy.
	Maximum.	Minimum.	Mean.		
1912.					
February 10-29	62	2.5	12.8	508	C.
March	124	1.0	21.2	1,300	C.
April	330	29	134	7,970	B.
May	225	44	140	8,610	B.
June	62	14	33.9	2,020	B.
July	8.0	1.0	3.40	209	C.
The period				20,600	
1915.					
April	66	15	36.0	2,140	B.
May	112	8	41.4	2,550	B.
June	11	6	7.1	422	C.
The period				5,110	

MISCELLANEOUS MEASUREMENTS.

The results of measurements of streams in the Great Basin at points other than those at which gaging stations are maintained are presented in the following table:

Miscellaneous measurements in Great Basin during the year ending Sept. 30, 1915.

Sevier Lake basin.

Date.	Stream.	Tributary to or diverting from—	Locality.	Gage height.	Discharge.
				Feet.	*Sec.-ft.*
Aug. 24	Sevier River	Sevier Lake	Immediately below heading of East Panquitch canal, near Panquitch, Utah.	....	6.2
25	do	do	Immediately below heading of Old Houston canal, near Panquitch, Utah.	....	30.1
25	do	do	Immediately below heading of Vaster canal, near Panquitch, Utah.	....	64
Jan. 14	do	do	County bridge at Marysvale, Utah.	....	36.2
June 12	do	do	Immediately below heading of Wells canal, near Joseph, Utah.	....	770
26	do	do	do	....	272

Miscellaneous measurements in Great Basin during the year ending Sept. 30, 1915—Continued.

Sevier Lake basin—Continued.

Date.	Stream.	Tributary to or diverting from—	Locality.	Gage height.	Discharge.
				Feet.	*Sec.-ft.*
July 6	Sevier River	Sevier Lake	Immediately below heading of Wells canal, near Joseph, Utah.		300
Aug. 31	do	do	do		112
June 26	do	do	Immediately below heading of Monroe canal, near Elsinore, Utah.		204
July 7	do	do	do		223
22	do	do	do		175
Aug. 30	do	do	do		76
June 25	do	do	Immediately below heading of Brooklyn canal, near Elsinore, Utah.		141
26	do	do	do		153
July 7	do	do	do		167
22	do	do	do		137
June 12	do	do	Immediately below heading of Richfield canal, near Elsinore, Utah.		40.7
25	do	do	do		36.1
26	do	do	do		36.6
July 8	do	do	do		44.7
21	do	do	do		48.8
Aug. 30	do	do	do		15.1
June 12	do	do	Immediately below heading of Annabella canal, near Elsinore, Utah.		33.0
July 8	do	do	do		2.3
21	do	do	do		13.9
Aug. 14	do	do	do		1.9
30	do	do	do		0
June 23	do	do	Immediately below heading of Vermillion canal, near Richfield, Utah.		15.8
July 8	do	do	do		2.0
Aug. 4	do	do	do		13.0
30	do	do	do		0
June 23	do	do	100 feet below Jumbo dam, near Sigurd, Utah.		79
July 9	do	do	do		62
20	do	do	Bridge below Jumbo dam, near Sigurd, Utah.		6.5
Aug. 14	do	do	do		8.2
July 8	do	do	100 feet below heading of Westview canal near Redmond, Utah.		32.3
Aug. 2	do	do	150 feet below heading of Westview canal.		76
30	do	do	200 feet below heading of Westview canal.		60
July 8	do	do	120 feet below heading of Fayette canal, near Centerfield, Utah.		46.2
Aug. 2	do	do	150 feet below heading of Fayette canal.		62
30	do	do	Immediately below heading of Fayette canal.		56
Mar. 9	do	do	500 feet above the Molen springs near Mills, Utah.		4.9
Dec. 13	do	do	½ mile below the lower Molen spring near Mills, Utah.		35.8
Jan. 23	do	do	do		61
Mar. 9	do	do	100 feet below the lower Molen spring.		37.2
Dec. 14	do	do	Railroad bridge at Mills, Utah, just below mouth of Chicken Creek.		42.0
Mar. 16	do	do	100 feet below railroad bridge at Mills, Utah.		48.9
Sept. 20	do	do	Private gage 300 feet below Delta spillway, 8 miles above Delta, Utah.	1.48	75
27	do	do	do	1.84	113
30	do	do	do	2.55	227
20	do	do	Old Riverside railroad bridge, ¼ mile below present Salt Lake Route bridge and about 5 miles below Delta spillway.		75

Miscellaneous measurements in Great Basin during the year ending Sept. 30, 1915—Continued.

Sevier Lake basin—Continued.

Date.	Stream.	Tributary to or diverting from—	Locality.	Gage height.	Discharge.
				Feet.	*Sec.-ft.*
July 30	Sevier River	Sevier Lake	Old gage 2 miles above dam of Gunnison Bend reservoir and about 1½ miles northwest of Delta, Utah.	2.10	161
Oct. 29	Duck Creek	Sink	Approximately in sec. 5, T. 38 S., R. 7 E., just above sink and about 15 miles southwest of Hatch, Utah.		10.3
29	Swain Creek	Asay Creek	Approximately in sec. 13, T. 38 S., R. 7 E., about 15 miles southwest of Hatch, Utah.		1.0
Dec. 12	Lost Creek	Sevier River	Bridge about 4 miles southwest of Salina, Utah.		[a]1.6
Jan. 22	do	do	do		[a]1.6
Dec. 12	Salina Creek	do	Railroad bridge at Salina, Utah, about ½ mile below regular gaging station.		12.2

Beaver River basin.

Date.	Stream.	Tributary to or diverting from—	Locality.	Gage height.	Discharge.
May 19	Beaver River	Beaver Lake	½ mile below station at Rockyford dam, near Minersville, Utah.		[b]23.6
Nov. 23	North Creek	Beaver River	Bridge at Greenville, Utah		[a]2.0
Jan. 27	do	do	do		[a]1.5

Minor basins in Nevada.

Date.	Stream.	Tributary to or diverting from—	Locality.	Gage height.	Discharge.
May 3	Quinn Canyon	Baker Creek	Mouth of canyon, approximately in sec. 24, T. 13 N., R. 69 E. About 3 miles southwest of Baker, Nev.		.6
July 10	do	do	do		.3
11	Weaver Creek	Snake Valley	Above Robeson's diversion approximately sec. 15, T. 14 N., R. 69 E., about 8 miles northwest of Baker, Nev.		4.1
May 2	Snake Creek	do	Approximately in sec. 15, T. 12 N., R. 70 E. At weir about 4 miles west of Garrison, Utah.		8.3
2	Garrison Big Wash	do	Narrows above Osborne's ranch, about 8 miles southwest of Garrison, Utah.		.8
2	do	do	Narrows at lower end of Osborne's ranch.		.7
4	Unnamed Creek	Steptoe Valley	Immediately above the reservoir at the McDermitt ranch of Steptoe Sheep Co. near Currie, Nev.		1.8
July 12	Nelson Creek	do	50 feet above railroad bridge near Currie, Nev.		2.1
8	White River	White River Valley	Midland Trail Bridge at McQueen's ranch, approximately in sec. 10, T. 12 N., R. 60 E.		3.6
8	Currant Creek	Railroad Valley	T. 11 N., R. 59 E., just above heading of feeder canal for Cazier's reservoir, near Currant, Nev.		5.7
8	Cazier's reservoir feeder canal.	Currant Creek	Head of canal		2.8
Sept. 8	Big Warm Spring outlet canal.	Duckwater Creek	Approximately in sec. 29, T. 13 N., R. 56 E., at weir about ½ mile south of Tognoni's house, Duckwater, Nev.		12.4

[a] Flow estimated.

[b] Gage at regular station read 2.65, corresponding to discharge of 14 second-feet.

Miscellaneous measurements in Great Basin during the year ending Sept. 30, 1915—Continued.

Minor basins in Nevada—Continued.

Date.	Stream.	Tributary to or diverting from—	Locality.	Gage height.	Discharge.
				Feet.	*Sec.-ft.*
Apr. 26	Blackbird Creek	Big Smoky Valley [a]	T. 18 N., R. 45 E., 2¼ miles above mouth of canyon, above Blackbird ranch, Lander County, Nev.		0.2
26	Birch Creek	do	Sec. 2, T. 17 N., R. 44 E., just above Spencer's upper ditch, Lander County, Nev.		1.6
June 30	do	do	do		2.7
Apr. 26	do	do	Former gaging station near Austin, Nev.	1.82	1.9
June 30	do	do	do	1.99	2.8
30	Lynch Creek	do	SE. ¼ sec. 5, T. 17 N., R. 44 E., at mouth of Canyon, Lander County, Nev.		.3
Apr. 26	Tar Creek	do	SE. ¼ sec. 8, T. 17 N., R. 44 E., ¼ mile above Cahill's house, Lander County, Nev.		1.5
June 30	do	do	do		.7
Apr. 26	Gilman Springs Creek	do	SW. ¼ sec. 3, T. 16 N., R. 44 E., of main road crossing, Lander County, Nev.		.2
June 30	do	do	do		.4
30	do	do	SW. ¼ sec. 33, T. 17 N., R. 44 E., just below springs.		.6
Apr. 25	Santa Fe Creek	do	Center of sec. 18, T. 16 N., R. 44 E., in mouth of canyon, near Schmidtlein's ranch, Lander County, Nev.		1.4
July 1	do	do	do		2.3
Apr. 25	Shoshone Creek	do	SW. ¼ sec. 18, T. 16 N., R. 44 E., in mouth of canyon, Lander County, Nev.		.6
July 1	do	do	do		1.1
Apr. 25	Santa Fe Creek	do	SW. ¼ sec. 16, T. 16 N., R. 44 E., at Schmidtlein's ranch road, Lander County, Nev.		1.0
July 1	do	do	SW. ¼ sec. 16, T. 16 N., R. 44 E., ¼ mile above Schmidtlein's ranch.		2.6
1	Schmidtlein's garden ditch.	do	Heading on Schmidtlein's ranch, Lander County, Nev.		.6
1	Kingston Creek	do	SW. ¼ sec. 21, T. 16 N., R. 43 E., in lower end of Daniels's field, Lander County, Nev.		10.0
Apr. 25	do	do	NE. ¼ sec. 35, T. 16 N., R. 43 E., at old mill.		3.4
July 1	do	do	do		14.9
1	do	do	1½ miles below old mill		1.8
1	do	do	4½ miles below old mill		1.1
Apr. 25	Clear Creek	do	SE. ¼ sec. 11, T. 15 N., R. 43 E., at mouth of canyon, Lander County, Nev.		1.0
July 2	do	do	do		2.7
Apr. 25	Carsley Creek	do	NE. ¼ sec. 13, T. 15 N., R. 43 E., at small house in mouth of canyon, Lander County, Nev.		1.2
July 2	do	do	do		4.4
2	Needles Creek	do	NW. ¼ sec. 2, T. 14 N., R. 43 E., at road near Frank Gedron's ranch, Nye County, Nev.		.5
Apr. 25	Decker Creek	do	Mouth of canyon, Nye County, Nev.		2.2
July 2	do	do	do		1.2
Apr. 25	do	do	SE. ¼ sec. 3, T. 14 N., R. 43 E., at main road.		.6
July 2	do	do	do		1.1

[a] For other measurements in Big Smoky Valley, see Water Supply Paper No. 423.

Miscellaneous measurements in Great Basin during the year ending Sept. 30, 1915—Continued.

Minor basins in Nevada—Continued.

Date.	Stream.	Tributary to or diverting from—	Locality.	Gage height.	Discharge.
				Feet.	*Sec.-ft*
Apr. 24	Blue Spring Creek	do	E. ½ sec. 7, T. 14 N., R. 43 E., at mouth of canyon, Nye County, Nev.		1.4
July 2	do	do	do		.7
2	do	do	NW. ¼ sec. 16, T. 14 N., R. 43 E., at Alice Gedron's garden.		.4
2	do	do	SW. ¼ sec. 16, T. 14 N., R. 43 E., at upper road.		.2
Apr. 24	do	do	SW. ¼ sec. 15, T. 14 N., R. 43 E., at lower road.		.7
24	Grinnell Creek	do	NE. ¼ sec. 28, T. 14 N., R. 43 E., at road, Nye County, Nev.		.4
23	Last Chance, Ophir, Wisconsin, and Summit creeks.	do	On Millett-Twin River road, in sec. 36. T. 13 N., R. 42 E., and sec. 2, T. 12 N., R. 42 E., Nye County, Nev.		1.2
July 3	do	do	NE. ¼ sec. 9, T. 12 N., R. 42 E., at Roger's ranch.		1.7
3	Ophir, Wisconsin, and Summit creeks.	do	1½ miles below mouths of each canyon, Nye County, Nev.		2.8
3	Last Chance Creek	do	1½ miles below mouth of canyon, Nye County, Nev.		1.2
Apr. 23	North Twin River	do	SW. ¼ sec. 15, T. 12 N., R. 42 E., ¼ mile below mouth of canyon, Nye County, Nev.		12.9
July 3	do	do	do		13.6
Apr. 23	South Twin River	do	NW. ¼ sec. 23, T. 12 N., R. 42 E., ¼ mile below mouth of canyon, Nye County, Nev.		8.5
July 3	do	do	do		14.4
Apr. 23	Belcher Creek	do	NW. ¼ sec. 1, T. 11 N., R. 42 E., at mouth of canyon, Nye County, Nev.		6.2
July 4	do	do	do		5.2
Apr. 23	do	do	1½ miles below mouth of canyon.		4.7
July 4	do	do	do		3.0
Apr. 21	Cove Creek	do	NE. ¼ sec. 13, T. 11 N., R. 42 E., at mouth of canyon, Nye County, Nev.		2.8
July 4	do	do	do		3.4
4	do	do	1½ miles below mouth of canyon, at road.		2.2
Apr. 20	Broad Creek	do	W. ½ sec. 31, T. 11 N., R. 43 E., at mouth of canyon, Nye County, Nev.		13.8
July 4	do	do	do		2.0
5	Jett Creek	do	SW. ¼ sec. 11, T. 10 N., R. 42 E., above pipeline intake, 1¾ miles above mouth of canyon, Nye County, Nev.		5.8
Apr. 20	do	do	Mouth of canyon		18.6
20	Pablo Creek	do	NE. ¼ sec. 25, T. 10 N., R. 42 E., at mouth of canyon, Nye County, Nev.		6.6
July 6	do	do	do		2.6
Apr. 20	Antelope Creek	do	NW. ¼ sec. 11, T. 9 N., R. 42 E., 300 feet above mouth of canyon, Nye County, Nev.		.01
19	Cloverdale Creek	do	NW. ¼ sec. 11, T. 8 N., R. 39 E., 1 mile above Cloverdale ranch, Nye County, Nev.		11.3
21	Jefferson Creek	do	SW. ¼ sec. 9, T. 10 N., R. 44 E., below North Jefferson Creek, Nye County, Nev.		16.8
July 4	do	do	do		1.1
5	do	do	SE. ¼ sec. 28, T. 11 N., R. 43 E., 6 miles below North Jefferson Creek.		1.6

Miscellaneous measurements in Great Basin during the year ending Sept. 30, 1915—Continued.

Minor basins in Nevada—Continued.

Date.	Stream.	Tributary to or diverting from—	Locality.	Gage height.	Discharge.
				Feet.	*Sec.-ft.*
Apr. 22	Shoshone Creek	Jefferson Creek	NE. ¼ sec. 17, T. 10 N., R. 44 E., at Shoshone, Nev.		0.1
22	Willow Creek	Big Smoky Valley	NE. ¼ sec. 29, T. 11 N., R. 44 E., at foothill road, Nye County, Nev.		1.2
July 5	do	do	do		.3
Apr. 22	Barker Creek	do	SE. ¼ sec. 15, T. 11 N., R. 44 E., above small cabin, at mouth of canyon, Nye County, Nev.		3.1
July 5	do	do	do		7.1
5	do	do	NE. ¼ sec. 12, T. 11 N., R. 43 E., at Cook's ranch, 5 miles below mouth of canyon.		2.8
Apr. 22	North Fork Barker Creek.	Barker Creek	Near a small ranch at mouth of Barker Canyon.		1.0
24	South Moore Creek	Big Smoky Valley	SE. ¼ sec. 26, T. 12 N., R. 44 E., at mouth of canyon, Nye County, Nev.		.2
July 3	do	do	do		2.6
Apr. 24	North Moore Creek	do	NE. ¼ sec. 26, T. 12 N., R. 44 E., at mouth of canyon, Nye County, Nev.		.9
July 3	do	do	do		4.6
May 5	Franklin River	Franklin Lake	T. 31 N., R. 60 E., at bridge where Elko to Currie road crosses river.		2.0
5	Short Creek	Franklin River	T. 31 N., R. 59 E., above diversions for Short ranch about 10 miles northeast of Ruby P. O.		3.6
5	Moores Creek	do	Approximately in sec. 29, T. 31 N., R. 59 E., above diversions, and near the school house.		2.3
5	North Gidney Creek	do	At road crossing, approximately sec. 32, T. 31 N., R. 59 E.		2.0
5	I. E. Wines Creek	do	do		1.7
20	Quinn River	Black Rock Desert	About 2 miles above the Home ranch of the Ellison Ranching Co., and about 45 miles north of Winnemucca. Nev.		37.8
20	Granite Creek	Quinn River	Adorn's ranch, about 3 miles north of Amos P. O., and about 30 miles north of Winnemucca.		8.7
18	King River	do	Bengoshea's ranch, about 2 miles above mouth of Log Cabin Creek, 7 miles above King River ranch, and about 85 miles northwest of Winnemucca.	2.56	21.3
19	do	do	do	2.56	21.6
18	do	do	Ford 2 or 3 miles below King River ranch.		14.4
18	Log Cabin Creek	King River	Just above confluence with King River, about 5 miles above King River ranch.		9.6

Mohave River basin.

Date.	Stream.	Tributary to or diverting from—	Locality.	Gage height.	Discharge.
June 29	Little Rock Creek		Head gate of Palmdale Water Co., near Little Rock, Cal.		5.4

Miscellaneous measurements in Great Basin during the year ending Sept. 30, 1915—Continued.

Mono Lake basin.

Date.	Stream.	Tributary to or diverting from—	Locality.	Gage height.	Discharge.
				Feet.	*Sec.-ft.*
Mar. 13	Rush Creek	Mono Lake	Former gaging station, in NE. ¼ sec. 13, T. 1 N., R. 26 E., at highway bridge one-fourth mile above mouth, near Mono Lake, Cal.	3.48	44

Walker Lake basin.

Nov. 28	East Walker River	Walker Lake	Former gaging station, in SW. ¼ SE. ¼ sec. 34, T. 6 N., R. 25 E., in Mono National Forest, about 4½ miles north of Bridgeport, Cal.	2.64	97
Mar. 17	do	do	do	2.79	150
21	do	do	do	2.99	180
Aug. 4	do	do	do	2.96	160
Nov. 29	Robinson Creek	East Walker River	Former gaging station, in SW. ¼ NW. ¼ sec. 15, T. 4 N., R. 24 E., at mouth of canyon, in Mono National Forest, 5 miles above junction with Buckeye Creek, near Bridgeport, Cal.	2.28	2.1
Mar. 20	do	do	do	2.65	21
Aug. 4	do	do	do	3.50	145
Nov. 29	Buckeye Creek	Robinson Creek	Former gaging station, in SE. ¼ NW. ¼ sec. 3, T. 4 N., R. 24 E., near mouth of canyon, in Mono National Forest, half a mile below Hot Springs, near Bridgeport, Cal.	2.50	3.3
Mar. 19	do	do	do	2.85	21
Aug. 4	do	do	do	3.38	76

Carson River basin.

Mar. 24	Markleeville ditch	Hot Springs Creek	Markleeville, Cal		1.2
Aug. 6	do	do	do		7.1

Humboldt River basin.

May 18	Humboldt River	Humboldt Sink	½ mile below dam near Mill City, Nev.		36.0
June 27	do	do	300 feet below dam near Mill City, Nev.		13.5
28	do	do	2 miles above Humboldt-Lovelock Irrigation Light & Power outlet canal, near Humboldt, Nev.	0.46	3.8
May 7	McDermott ditch	Lamoille Creek	Head, near Lamoille, Nev.		7.4
8	do	do	do		6.5
Apr. 17	Reese River	Humboldt River	First house above Walsh's red brick, 26 miles below Bell's, and 30 miles from Austin, Nev.		9.0
18	Big Creek	Reese River	Former gaging station at Carter's ranch, near Austin, Nev.	1.69	3.1
June 28	do	do	do	1.85	9.5
May 22	Rock Creek	Humboldt River	Mouth of canyon, 25 miles above Battle Mountain, Nev.		15.0

Miscellaneous measurements in Great Basin during the year ending Sept. 30, 1915—Continued.

Warner Lakes basin.

Date.	Stream.	Tributary to or diverting from—	Locality.	Gage height.	Discharge.
				Feet.	*Sec.-ft.*
Mar. 30	Unnamed Creek	Coleman Valley	Above reservoir, in sec. 5, T. 41 S, R. 25 E.		1.6
Apr. 19	Crump ditch	Deep Creek	Near Intake at Adel, Oreg		1.0
May 12	Wible-Messner ditch	do	do		8.9
Mar. 21	Fish Creek	Hart Lake	Above Pridays reservoir, near Plush, Oreg.		[b] 3.0
Apr. 2	do	do	do		1.5
7	do	do	do		[b] 1.0
May 4	do	do	do		2.4
Apr. 25	Honey Creek	do	Below all diversions, about 1½ miles below gaging station, near Plush, Oreg.		20.1
1	Snyder Creek	Honey Creek	Just above Colvin Creek, about 10 miles northwest of Plush, Oreg.		4.6
Do.	Colvin Creek	Snyder Creek	Mouth, about 10 miles northwest of Plush, Oreg.		3.0
Do.	North "7T" ditch	Honey Creek	Intake, near Plush, Oreg		5.6
8	do	do	do		6.8
1	Middle "7T" ditch	do	do		2.0
8	do	do	do		2.9
1	South "7T" ditch	do	do		10.3
8	do	do	do		12.6
Mar. 24	Five small streams from west side of Hart Mountain.	Marsh north of Hart Lake.	Above diversions, near "7T" and Stein ranches		[b] 1.5
May 3	do	do	do		5.4

Summer Lake basin.

Dec. 12	Ana River	Summer Lake	Former gaging station near Summer Lake, Oreg.		131
May 17	do	do	do	3.23	134

Silver Lake basin.

Mar. 20	Silver Creek	Silver Lake	Sec. 17, T. 30 S., R. 14 E., near Silver Lake, Oreg.		21.0
July 22	Bridge Creek	Silver Creek	Former gaging station near Silver Lake, Oreg.		.5
22	Buck Creek	Silver Lake	do	4.50	4.5

Malheur Lake basin.

Apr. 27	Keiger Creek	Donner und Blitzen River.	Former gaging station near Diamond, Oreg.	1.70	37.0
June 3	do	do	do	2.01	60
Aug. 24	do	do	do	1.03	4.4
Apr. 28	Cucamonga Creek	Keiger Creek	do	.27	.2
June 13	do	do	do	1.40	6.2
Apr. 28	McCoy Creek	do	do	2.31	53
June 14	do	do	do	2.39	60
Aug. 23	do	do	do	1.18	2.0

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U. S. Office of Indian Affairs, acknowledgment to ---- 14

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STREAM-GAGING STATIONS

AND

PUBLICATIONS RELATING TO WATER RESOURCES

PART X. GREAT BASIN

STREAM-GAGING STATIONS AND PUBLICATIONS RELATING TO WATER RESOURCES.

INTRODUCTION.

Investigation of water resources by the United States Geological Survey has consisted in large part of measurements of the volume of flow of streams and studies of the conditions affecting that flow, but it has comprised also investigation of such closely allied subjects as irrigation, water storage, water powers, underground waters, and quality of waters. Most of the results of these investigations have been published in the series of water-supply papers, but some have appeared in the bulletins, professional papers, monographs, and annual reports.

The results of stream-flow measurements are now published annually in 12 parts, each part covering an area whose boundaries coincide with natural drainage features as indicated below.

Part I. North Atlantic slope basins.
II. South Atlantic and eastern Gulf of Mexico basins.
III. Ohio River basin.
IV. St. Lawrence River basin.
V. Upper Mississippi River and Hudson Bay basins.
VI. Missouri River basin.
VII. Lower Mississippi River basin.
VIII. Western Gulf of Mexico basins.
IX. Colorado River basin.
X. Great Basin.
XI. Pacific slope basins in California.
XII. North Pacific slope basins, in three volumes:
    A. Pacific slope basins in Washington and upper Columbia River basin.
    B. Snake River basin.
    C. Lower Columbia River basin and Pacific slope basins in Oregon.

HOW GOVERNMENT REPORTS MAY BE OBTAINED OR CONSULTED.

Water-supply papers and other publications of the United States Geological Survey containing data in regard to the water resources of the United States may be obtained or consulted as indicated below.

1. Copies may be obtained free of charge by applying to the Director of the Geological Survey, Washington, D. C. The edition printed for free distribution is, however, small and is soon exhausted.

2. Copies may be purchased at nominal cost from the Superintendent of Documents, Government Printing Office, Washington, D. C., who will furnish lists giving prices.

3. Sets of the reports may be consulted in the libraries of the principal cities in the United States.

4. Complete sets are avilable for consultation in the local offices of the water-resources branch of the Geological Survey, as follows:

Albany, N. Y., Room 18, Federal Building.
Atlanta, Ga., Post Office Building.
Boston, Mass., 2500 Customhouse.
St. Paul, Minn., Old Capitol Building.
Madison, Wis., care of Railroad Commission of Wisconsin.
Boise, Idaho, 615 Idaho Building.
Helena, Mont., Montana National Bank Building.
Topeka, Kans., 25 Federal Building.
Denver, Colo., 403 New Post Office Building.
Phoenix, Ariz., 417 Fleming Building.
Salt Lake City, Utah, 421 Federal Building.
Tacoma, Wash., 406 Federal Building.
Portland, Oreg., 416 Couch Building.
San Francisco, Cal., 328 Customhouse.
Los Angeles, Cal., 619 Federal Building.
Honolulu, Hawaii, 14 Capitol Building.

A list of the Geological Survey's publications may be obtained by applying to the Director of the United States Geological Survey, Washington, D. C.

STREAM-FLOW REPORTS.

Stream-flow records have been obtained at more than 3,800 points in the United States, and the data obtained have been published in the reports tabulated below:

Stream-flow data in reports of the United States Geological Survey.

[A—Annual Report; B—Bulletin; W—Water-Supply Paper.]

Report.	Character of data.	Year.
10th A, pt. 2	Descriptive information only.	
11th A, pt. 2	Monthly discharge and descriptive information.	1884 to Sept., 1890.
12th A, pt. 2	do	1884 to June 30, 1891.
13th A, pt. 3	Mean discharge in second-feet	1884 to Dec. 31, 1892.
14th A, pt. 2	Monthly discharge (long-time records, 1871 to 1893)	1888 to Dec. 31, 1893.
B 131	Descriptions, measurements, gage heights, and ratings.	1893 and 1894.
16th A, pt. 2	Descriptive information only.	
B 140	Descriptions, measurements, gage heights, ratings, and monthly discharge (also many data covering earlier years).	1895.
W 11	Gage heights (also gage heights for earlier years).	1896.
18th A, pt. 4	Descriptions, measurements, ratings, and monthly discharge (also similar data for some earlier years).	1895 and 1896.
W 15	Descriptions, measurements, and gage heights, eastern United States, eastern Mississippi River, and Missouri River above junction with Kansas.	1897.
W 16	Descriptions, measurements, and gage heights, western Mississippi River below junction of Missouri and Platte, and western United States.	1897.
19th A, pt. 4	Descriptions, measurements, ratings, and monthly discharge (also some long-time records).	1897.
W 27	Measurements, ratings, and gage heights, eastern United States, eastern Mississippi River, and Missouri River.	1898.
W 28	Measurements, ratings, and gage heights, Arkansas River and western United States.	1898.

Stream-flow data in reports of the United States Geological Survey—Continued.

[A=Annual Report; B=Bulletin; W=Water-Supply Paper.]

Report.	Character of data.	Year.
20th A, pt. 4	Monthly discharge (also for many earlier years)	1898.
W 35 to 39	Descriptions, measurements, gage heights, and ratings	1899.
21st A, pt. 4	Monthly discharge	1899.
W 47 to 52	Descriptions, measurements, gage heights, and ratings	1900.
22d A, pt. 4	Monthly discharge	1900.
W 65, 66	Descriptions, measurements, gage heights, and ratings	1901.
W 75	Monthly discharge	1901.
W 82 to 85	Complete data	1902.
W 97 to 100	do	1903.
W 124 to 135	do	1904.
W 165 to 178	do	1905.
W 201 to 214	do	1906.
W 241 to 252	do	1907-8.
W 261 to 272	do	1909.
W 281 to 292	do	1910.
W 301 to 312	do	1911.
W 321 to 332	do	1912.
W 351 to 362	do	1913.
W 381 to 394	do	1914.
W 401 to 414	do	1915.

NOTE.—No data regarding stream flow are given in the 15th and 17th annual reports.

The records at most of the stations discussed in these reports extend over a series of years, and miscellaneous measurements at many points other than regular gaging stations have been made each year. An index of the reports containing records obtained prior to 1904 has been published in Water-Supply Paper 119.

The table which follows gives, by years and drainage basins, the numbers of the papers on surface-water supply published from 1899 to 1915. The data for any particular station will in general be found in the reports covering the years during which the station was maintained. For example, data for Machias River at Whitneyville, Maine, 1903 to 1915, are published in Water-Supply Papers 97, 124, 165, 201, 241, 261, 281, 301, 321, 351, 381, and 401, which contain records for the New England streams from 1903 to 1915. Results of miscellaneous measurements are published by drainage basins.

In these papers and in the following lists the stations are arranged in downstream order. The main stem of any river is determined by measuring or estimating its drainage area—that is, the headwater stream having the largest drainage area is considered the continuation of the main stream, and local changes in name and lake surface are disregarded. All stations from the source to the mouth of the main stem of the river are presented first, and the tributaries in order from source to mouth follow, the streams in each tributary basin being listed before those of the next basin below.

In exception to this rule the records for Mississippi River are given in four parts, as indicated on page III, and the records for large lakes are taken up in order of streams around the rim of the lake.

Numbers of water-supply papers containing results of stream measurements, 1899–1915.

Year.	I	II	III	IV	V	VI	VII	VIII	IX	X	XI	XII North Pacific slope basins.		
	North Atlantic slope basins (St. John River to York River).	South Atlantic and eastern Gulf of Mexico basins (James River to the Mississippi).	Ohio River basin.	St. Lawrence River and Great Lakes basins.	Hudson Bay and upper Mississippi River basins.	Missouri River basin.	Lower Mississippi River basin.	Western Gulf of Mexico basins.	Colorado River basin.	Great Basin.	Pacific slope basins in California.	Pacific slope basins in Washington and upper Columbia River basin.	Snake River basin.	Lower Columbia River basin and Pacific slope basins in Oregon.
1899[a]	35	[b]35, 36	36	36	36	[c]36, 37	37	37	[d]37, 38	38, [e]39	38, [f]39	38	38	38
1900[g]	47, [h]48	48	48, [i]49	49	49	49, [j]50	50	50	50	51	51	51	51	51
1901	65, 75	65, 75	65, 75	65, 75	[k]65, 66, 75	66, 75	[k]65, 66, 75	66, 75	66, 75	66, 75	66, 75	66, 75	66, 75	66, 75
1902	82	[b]82, 83	83	[l]82, 83	[k]83, 85	84	[k]83, 84	84	85	85	85	85	85	85
1903	97	[b]97, 98	98	97	[k]98, 99, [m]100	99	[k]98, 99	99	100	100	100	100	100	100
1904	[n]124, [o]125, [p]126	[p]126, 127	128	129	[k]128, 130	130, [q]131	[k]128, 131	132	133	133, [r]134	134	135	135	135
1905	[n]165, [o]166, [p]167	[p]167, 168	169	170	171	172	[k]169, 173	174	175, [s]177	176, [r]177	177	178	178	[t]177, 178
1906	[n]201, [o]202, [p]203	[p]203, 204	205	206	207	208	[k]205, 209	210	211	212, [r]213	213	214	214	214
1907–8	241	242	243	244	245	246	247	248	249	250, [r]251	251	252	252	252
1909	261	262	263	264	265	266	267	268	269	270, [r]271	271	272	272	272
1910	281	282	283	284	285	286	287	288	289	290	291	292	292	292
1911	301	302	303	304	305	306	307	308	309	310	311	312	312	312
1912	321	322	323	324	325	326	327	328	329	330	331	332–A	332–B	332–C
1913	351	352	353	354	355	356	357	358	359	360	361	362–A	362–B	362–C
1914	381	382	383	384	385	386	387	388	389	390	391	392	393	394
1915	401	402	403	404	405	406	407	408	409	410	411	412	413	414

[a] Rating tables and index to Water-Supply Papers 35–39 contained in Water-Supply Paper 39. Tables of monthly discharge for 1899 in Twenty-first Annual Report, Part IV.

[b] James River only.

[c] Gallatin River.

[d] Green and Gunnison rivers and Grand River above junction with Gunnison.

[e] Mohave River only.

[f] Kings and Kern rivers and south Pacific slope drainage basins.

[g] Rating tables and index to Water-Supply Papers 47-52 and data on precipitation, wells, and irrigation in California and Utah contained in Water-Supply Paper 52. Tables of monthly discharge for 1900 in Twenty-second Annual Report, Part IV.

[h] Wissahickon and Schuylkill rivers to James River.

[i] Scioto River.

[j] Loup and Platte rivers near Columbus, Nebr., and all tributaries below junction with Platte.

[k] Tributaries of Mississippi from east.

[l] Lake Ontario and tributaries to St. Lawrence River proper.

[m] Hudson Bay only.

[n] New England rivers only.

[o] Hudson River to Delaware River, inclusive.

[p] Susquehanna River to Yadkin River, inclusive.

[q] Platte and Kansas rivers.

[r] Great Basin in California except Truckee and Carson river basins.

[s] Below junction with Gila.

[t] Rogue, Umpqua, and Siletz rivers only.

PART X. THE GREAT BASIN.

PRINCIPAL DIVISIONS.

The Great Basin is made up of a number of minor basins whose streams do not discharge into the ocean. The largest of these minor basins are the depressions that hold Great Salt Lake, Sevier Lake, Humboldt Sink, Truckee, Walker, Carson, and Owens rivers, and Honey, Mono, Malheur, Harney, Warner, Abert, Summer, and Silver lakes. The streams of this section drain wholly or in part the States of California, Idaho, Nevada, Oregon, Utah, and Wyoming.

In addition to the list of gaging stations and the annotated list of publications relating specifically to the section, these pages contain a similar list of reports that are of general interest in many sections and cover a wide range of hydrologic subjects, and also brief references to reports published by State and other organizations (see p. XXIV).

GAGING STATIONS.

NOTE.—Dash after a date indicates that station was being maintained September 30, 1915. Period after a date indicates discontinuance.

GREAT SALT LAKE BASIN.

Great Salt Lake at Saltair, Utah, 1904; 1912–
Great Salt Lake at Midlake, Utah, 1912–
Great Salt Lake at Garfield Beach gage, Utah, 1875–1899.
    Bear River near Evanston, Wyo., 1913–
    Bear River near Harer, Idaho, 1913–
    Bear River at Dingle, Idaho, 1903–1914.
    Bear River at Soda Springs, Idaho, 1896.
    Bear River at Alexander, Idaho, 1911–
    Bear River near Preston, Idaho, 1889–
    Bear River near Collinston, Utah, 1889–
        Bear (Mud) Lake inlet canal near Dingle, Idaho, 1911–1913.
        Bear Lake at Fishaven, Idaho, 1904–1906.
        Georgetown Creek near Georgetown, Idaho, 1911–1914.
        Soda Creek near Soda Springs, Idaho, 1913–
        Cub Creek near Franklin, Idaho, 1900–1901.
        Logan River above State dam, near Logan, Utah, 1913–
        Logan River near Logan, Utah, 1896–1912.
        Logan River below State dam, near Logan, Utah, 1913–14.
        Logan River below Logan Northern canal, near Logan, Utah, 1915–
            Utah Power & Light Co.'s tailrace near Logan, Utah, 1913–
            Logan, Hyde Park, and Smithfield canal near Logan, Utah, 1904–1907; 1909–
            Logan Northern canal near Logan, Utah, 1913–
            Blacksmith Fork above Utah Power & Light Co.'s dam, near Hyrum, Utah, 1900–1902; 1913–
            Blacksmith Fork at Utah Power & Light Co.'s plant, near Hyrum, Utah, 1914–

- Great Salt Lake—Continued.
  - Bear River tributaries—Continued.
    - Logan River—Continued.
      - Blacksmith Fork below Utah Power & Light Co.'s plant, near Hyrum, Utah, 1904–1910; 1914–
        - Hyrum power-plant canal (Blacksmith Fork power-plant race) near Hyrum, Utah, 1904–1910; 1914–
    - West Side canal near Collinston, Utah, 1912–
    - Hammond (East Side) canal near Collinston, Utah, 1912–
    - Little Malad River near Malad, Idaho, 1911–1913.
    - Box Elder Creek at Brigham, Utah, 1909–1912.
  - Weber River near Oakley, Utah, 1904–
  - Weber River at Devils Slide (Croydon), Utah, 1905–
  - Weber River near Uinta, Utah, 1889–1903.
  - Weber River near Plain City, Utah, 1903–
    - Chalk Creek at Coalville, Utah, 1904–5.
    - Lost Creek near Croydon, Utah, 1905.
    - Ogden River at upper end of canyon, near Ogden, Utah, 1895–1896.
    - Ogden River at Utah Light & Railway Co.'s dam, near Ogden, Utah, 1904–1912.
    - Ogden River at powder mill, near Ogden, Utah, 1889–1890; 1897–1899.
  - Mill Creek near Bountiful, Utah, 1913–14.
  - Jordan River near Lehi, Utah, 1904; 1913–
    - Utah Lake near Spanish Fork, Utah, 1889–1896.
    - Utah Lake at Geneva, near outlet, Utah, 1896–1900.
      - Summit Creek near Santaquin, Utah, 1905; 1910–
      - Peteetneet Creek near Payson, Utah, 1910–
      - Spanish Fork at Thistle, Utah, 1907–
      - Spanish Fork near Spanish Fork (Mapleton), Utah, 1900–1901; 1903–
      - Spanish Fork at Lake Shore, Utah, 1903–1907; 1909–
        - Diamond Fork near Thistle, Utah, 1907–
        - United States Reclamation Service power canal near Spanish Fork, Utah, 1909–
      - Hobble Creek near Springville, Utah, 1904–
      - Maple Creek near Springville, Utah, 1910–1913.
      - Provo River at Forks, Utah, 1911–
      - Provo River above Telluride Power Co.'s dam, near Provo, Utah, 1905–1911.
      - Provo River at mouth of canyon, near Provo, Utah, 1889–1906.
      - Provo River at Denver & Rio Grande Railroad bridge, near Provo, Utah, 1905.
      - Provo River at San Pedro, Los Angeles & Salt Lake Railroad bridge, near Provo, Utah, 1903–4.
        - South Fork of Provo River at Forks, Utah, 1911–
      - American Fork above South Fork, near American Fork, Utah, 1912–
      - American Fork near American Fork, Utah, 1900–1901; 1903–1905.
        - South Fork of American Fork near American Fork, Utah, 1912–
    - Little Cottonwood Creek near Salt Lake City, Utah, 1898–1913.
    - Big Cottonwood Creek near Salt Lake City, Utah, 1898–1913.
    - Mill Creek near Salt Lake City, Utah, 1898–1913.
    - Parleys Creek near Salt Lake City, Utah, 1898–1913.
      - Emigration Creek near Salt Lake City, Utah, 1898–1913.
    - City Creek near Salt Lake City, Utah, 1898–1913.

SEVIER LAKE BASIN.

- Mammoth Creek (head of Sevier River) near Hatch, Utah, 1912; 1913–14.
- Sevier River at Hatch, Utah, 1911–
- Sevier River near Panguitch, Utah, 1914.
- Sevier River near Circleville, Utah, 1912; 1914–
- Sevier River near Kingston, Utah, 1914–
- Sevier River near Junction, Utah, 1911; 1912–
- Piute reservoir near Marysvale, Utah, 1914.
- Sevier River below Piute dam, near Marysvale, Utah, 1911; 1912–
- Sevier River at Pitts ranch, near Marysvale, Utah, 1906–1911.
- Sevier River at Marysvale, Utah, 1912–1914.
- Sevier River at Sevier, Utah, 1911–
- Sevier River at Joseph, Utah, 1889.
- Sevier River near Vermilion, Utah, 1912; 1914–
- Sevier River near Gunnison, Utah, 1900–
- Sevier River at Clarks bridge, near Fayette, Utah, 1914–
- Sevier River at McArtie's Ford, near Fayette, Utah, 1914.
- Sevier Bridge reservoir near Juab, 1914.
- Sevier River near Juab, Utah, 1911–
- Sevier River near Mills, Utah, 1914–
- Sevier River at Leamington, Utah, 1889–1898; 1912–1914.
- Sevier River near Lynndyl, Utah, 1914–
- Delta & Melville reservoir near Delta, Utah, 1914.
- Sevier River near Delta, Utah, 1912; 1913–
- Gunnison Bend reservoir near Delta, Utah, 1914.
- Sevier River at Oasis, Utah, 1913–
  - Hatch Bench canal near Hatch, Utah, 1914.
  - Asay Creek near Hatch, Utah, 1912; 1913–14.
  - State canal near Panguitch, Utah, 1913; 1914.
  - Long canal near Panguitch, Utah, 1914.
  - East Panguitch canal near Panguitch, Utah, 1914.
  - McEwen canal near Panguitch, Utah, 1914.
  - Fox canal near Circleville, Utah, 1914.
  - Circleville canal near Circleville, Utah, 1914.
  - Old Kingston canal near Circleville, Utah, 1914.
  - Dalton canal at Circleville, Utah, 1914.
  - Mitchels Slough:
    - Mitchells Slough canal near Junction, Utah, 1914.
  - East Fork of Sevier River near Kingston, Utah, 1912; 1913–
  - East Fork of Sevier River at Junction, Utah, 1913.
    - Otter Creek reservoir near Coyoto, Utah, 1914.
    - Otter Creek reservoir canal near Coyoto, Utah, 1914–15.
    - Otter Creek near Coyoto, Utah, 1913; 1914–
    - Kingston canal at Kingston, Utah, 1914.
  - Pine Creek at Marysvale, Utah, 1914.
  - Clear Creek at Sevier, Utah, 1912–
    - Cove canal at Sevier, Utah, 1914.
  - Monroe South Bend canal near Joseph, Utah, 1914.
  - Sevier Valley canal near Joseph, Utah, 1912.
  - Sevier Valley canal at Elsinore, Utah, 1913.
  - Sevier Valley canal near Richfield, Utah, 1912–1914.
  - State canal near Vermilion, Utah, 1913.
  - State canal near Aurora, Utah, 1913.
  - State canal near Salina, Utah, 1913.

- Sevier River tributaries—Continued.
  - State canal near Redmond, Utah, 1913; 1914.
    - Joseph canal near Joseph, Utah, 1914.
  - Wells canal near Joseph, Utah, 1914.
  - Monroe canal near Elsinore, Utah, 1914.
  - Elsinore canal near Elsinore, Utah, 1914.
  - Brooklyn canal near Elsinore, Utah, 1914.
  - Richfield canal near Elsinore, Utah, 1914.
  - Annabella canal at Elsinore, Utah, 1914.
  - Vermilion canal near Richfield, Utah, 1914.
  - Rockyford canal near Vermilion, Utah, 1914.
  - Salina Creek at Salina, Utah, 1914–
  - West View canal at Redmond, Utah, 1914.
  - Fayette canal near Centerfield, Utah, 1914.
  - Dover canal near Gunnison, Utah, 1914.
  - San Pitch River near Gunnison, Utah, 1900–1905; 1912.
    - Manti Creek near Manti, Utah, 1900.
  - Wellington canal near Mills, Utah, 1914.
  - Sevier River Land & Water Co.'s canal near Leamington, Utah, 1914.
  - Sevier River Land & Water Co.'s canal above Fool Creek reservoir, near Lynndyl, Utah, 1914.
    - Sevier River Land & Water Co.'s by-pass near Lynndyl, Utah, 1914.
  - Sevier River Land & Water Co.'s reservoir No. 1 (Fool Creek reservoir) near Lynndyl, Utah, 1914.
  - McIntyre canal near Leamington, Utah, 1914.
  - Leamington canal near Leamington, Utah, 1914.
  - Delta and Mellville canal (Canal A) near Delta, Utah, 1912.
    - Canal B at intake, near Delta, Utah, 1912.
      - Lyman's ditch near Delta, Utah, 1912.
    - Melville West Side canal near Delta, Utah, 1912.
    - Canal C at head gate near Delta, Utah, 1912.
  - Melville Main canal near Delta, 1912.
  - Midland canal near Delta, Utah, 1914.
  - Abraham canal near Delta, Utah, 1913; 1914.
  - Deseret High-Line canal near Delta, Utah, 1913; 1914.
  - Deseret canal near Delta, Utah, 1913; 1914.
    - Smith canal near Delta, Utah, 1914.

STREAMS IN PAVANT VALLEY.

- Chalk Creek near Fillmore, Utah, 1914.
- Pine Creek near Fillmore, Utah, 1914.
- Meadow Creek near Meadow, Utah, 1914.
- Corn Creek near Kanosh, Utah, 1914.

BEAVER RIVER BASIN.

- Beaver River near Beaver, Utah, 1906; 1914–
- Beaver River at Adamsville, Utah, 1913–
- Beaver River at Rockyford dam, near Minersville, Utah, 1913–
- Beaver River at Minersville, Utah, 1909–1913.
- Beaver River at Milford, Utah, 1914.
  - South Creek near Beaver, Utah, 1906.
  - North Fork of North Creek (head of North Creek) near Beaver, Utah, 1906.
    - South Fork of North Creek near Beaver, Utah, 1906.
  - Indian Creek at Adamsville, near Beaver, Utah, 1906; 1914–
  - Minersville canal at Minersville, Utah, 1906; 1914.
  - Coal Creek near Cedar City, Utah, 1915–

MINOR BASINS IN NEVADA.

Thousand Springs Creek near Tecoma, Nev., 1910–1913.
Snake Creek near Baker, Nev., 1913–
Baker Creek near Baker, Nev., 1913–
Cleveland Creek near Osceola, Nev., 1914–
White River near Preston, Nev., 1914.
Currant Creek at Ranger Station near Currant, Nev., 1913.
Currant Creek at Cazier's Ranch near Currant, Nev., 1913; 1914–
Birch Creek near Austin, Nev., 1913; 1914.

SALTON SINK BASIN.

Salton Sea near Salton, Cal., 1904–
  Alamo River near Brawley, Cal., 1909–1912.
  New River near Brawley, Cal., 1909–1911.

OWENS LAKE BASIN.

Owens River near Round Valley, Cal., 1903–
Owens River near Big Pine [Tinemaha], Cal., 1906–
Owens River near Lone Pine, Cal., 1909–
Owens River near Citrus, Cal., 1903–1906.
Owens Lake near Lone Pine (Olancha), Cal., 1908–
  Rock Creek near Round Valley, Cal., 1903–
    Pine Creek near Round Valley, Cal., 1903–
  Owens River canal near Bishop, Cal., 1903–1905.
  McNally canal near Bishop, Cal., 1903–1905.
  Farmers canal near Bishop, Cal., 1903–1905.
  Bishop Creek near Bishop, Cal., 1903–1911.
  Hillside (North) canal near Bishop, Cal., 1903–1905.
  Hillside (South) canal near Bishop, Cal., 1903–1905.
  Powers canal near Bishop, Cal., 1903–1905.
  Bishop Creek canal near Bishop, Cal., 1903–1905.
  Collins (George) canal near Bishop, Cal., 1903–1906.
  Collins (A. O.) canal near Bishop, Cal., 1903–1906.
  Dell canal near Bishop, Cal., 1903–1906.
  Big Pine and Owens River canal near Bishop, Cal., 1903–1905.
  Rawson canal near Bishop, Cal., 1903–1905.
  Sanger canal near Alvord, Cal., 1903–1905.
  Baker Creek near Big Pine, Cal., 1908–1911.
  Big Pine Creek near Big Pine, Cal., 1903–1911.
  Tinemaha Creek near Big Pine [Tinemaha], Cal., 1906–1911.
  Birch Creek near Big Pine [Tinemaha], Cal., 1905; 1906–1911.
  Taboose Creek near Aberdeen, Cal., 1906–1911.
  Goodale Creek near Aberdeen, Cal., 1906–1911.
  Division Creek near Independence, Cal., 1906–1910.
  Eightmile (Sawmill) Creek near Independence, Cal., 1906–1910.
  Thibaut Creek near Independence, Cal., 1908–1911.
  East Side canal near Citrus, Cal., 1903–1906.
  Stevens canal near Citrus, Cal., 1903–1905.
  Oak Creek near Independence, Cal., 1905–1911:
  Little Pine (Independence) Creek near Independence, Cal., 1905–1911.
  Shepard Creek near Thebe, Cal., 1906–1910.
  Bairs Creek near Thebe, Cal., 1906–1911.
  George Creek near Thebe, Cal., 1906–1911.

Owens River tributaries—Continued.
  Lone Pine Creek near Lone Pine, Cal., 1906–1911.
    Tuttle Creek near Lone Pine, Cal., 1906–1911.
  Cottonwood Creek near Olancha, Cal., 1906–1911.
  Ash Creek near Olancha, Cal., 1907–1911.

ANTELOPE VALLEY BASIN.

Littlerock Creek near Palmdale, Cal., 1896–1898.

MOHAVE RIVER BASIN.

Mohave River near Victorville, Cal., 1899–1906.

MONO LAKE BASIN.

Mono Lake near Mono Lake, Cal., 1912–
  Rush Creek near Mono Lake, Cal., 1910–1914.
  Leevining Creek near Mono Lake, Cal., 1910–1915.

WALKER LAKE BASIN.

East Walker River (head of Walker River), Bridgeport, Cal., 1911–1914.
East Walker River near Yerington, Nev., 1902–1908.
East Walker River near Mason, Nev., 1910–1912; 1913–
Walker River near Nordyke, Nev., 1895.
Walker River at Mason, Nev., 1910–1912; 1913–
Walker River at Schurz, Nev., 1913–
Walker River near Wabuska, Nev., 1902–1908.
  Robinson Creek near Bridgeport, Cal., 1910–1914.
  Buckeye Creek near Bridgeport, Cal., 1910–1914.
    Swager Creek near Bridgeport, Cal., 1911–1915.
  West Walker River near Coleville, Cal., 1902–1908; 1909–1910; 1915–
  West Walker River near Wellington, Nev., 1910.
  West Walker River at Smith, Nev., 1910.
  West Walker River at Hudson, Nev., 1914–
    East Fork of West Walker River near Bridgeport, Cal., 1910.

HUMBOLDT-CARSON SINK.

Carson River basin:
  Carson River, East Fork (head of Carson River), at Silver King Valley, near Markleeville, Cal., 1910–1913.
  Carson River, East Fork, near Markleeville, Cal., 1910–
  Carson River, East Fork, at Rodenbah's ranch, near Gardnerville, Nev., 1900–1906.
  Carson River, East Fork, at Horseshoe Bend, near Gardnerville, Nev., 1908–1910.
  Carson River, East Fork, at California-Nevada State line, 1911–1914.
  Carson River near Empire, Nev., 1895; 1900–
  Carson River near Fort Churchill, Nev., 1911–1914.
  Carson River near Hazen, Nev., 1908–1910.
    Silver Creek near Markleeville, Cal., 1910–1913.
    Markleeville Creek above Markleeville, Cal., 1911–
    Markleeville Creek at Markleeville, Cal., 1910–
      Pleasant Valley Creek near Markleeville, Cal., 1910–1911.
    West Fork of Carson River at Woodfords, Cal., 1890–1892; 1900–

- Humboldt River basin:
  - Humboldt River near Elko, Nev., 1895–1902.
  - Humboldt River at Palisade, Nev., 1902–1906; 1911–
  - Humboldt River at Battle Mountain, Nev., 1896–7.
  - Humboldt River near Golconda, Nev., 1894–1909; 1910–
  - Humboldt River near Oreana, Nev., 1896–1909; 1910–
  - Humboldt River near Lovelocks, Nev., 1912–
    - Bishop Creek near Wells, Nev., 1910.
    - Marys River at Marys River Cabin, near Deeth, Nev., 1913–14.
    - Marys River at Buena Vista ranch, near Deeth, Nev., 1913–14.
    - Marys River near Deeth, Nev., 1902–3; 1912–
      - Hanks Creek near Deeth, Nev., 1913–14.
    - Starr Creek near Deeth, Nev., 1913–
    - Lamoille Creek near Lamoille, Nev., 1915–
    - Lamoille Creek near Halleck, Nev., 1913–
    - North Fork of Humboldt River near Peko, Nev., 1898–1900.
    - North Fork of Humboldt River at Devils Gate, near Halleck, Nev., 1913–
    - North Fork of Humboldt River near Halleck, Nev., 1902–1909; 1910–1913.
    - South Fork of Humboldt River near Elko, Nev., 1896–1909; 1910–
    - Maggie Creek at Carlin, Nev., 1913–
    - Pine Creek at Palisade, Nev., 1902–1904; 1912–
    - Rock Creek at Rock Creek ranch, near Battle Mountain, Nev., 1915–
    - Rock Creek near Battle Mountain, Nev., 1896.
    - Reese River near Berlin, Nev., 1913–
      - Big Creek near Austin, Nev., 1913–14.
    - Humboldt-Lovelocks Irrigation Light & Power Co.'s canal near Mill City, Nev., 1914–
    - Humboldt-Lovelocks Irrigation Light & Power Co.'s canal near Humboldt, Nev., 1914–

PYRAMID AND WINNEMUCCA LAKE BASINS.

- Lake Tahoe at Tahoe, Cal., 1900–
- Truckee River at Tahoe, Cal., 1895–96; 1900–
- Truckee River near Boca, Cal., 1890.
- Truckee River at Iceland, Cal., 1912–
- Truckee River at Nevada-California State line, 1899–1912.
- Truckee River at Laughton, Nev., 1890.
- Truckee River at Reno, Nev., 1906–
- Truckee River near Essex, Nev., 1889.
- Truckee River at Vista, Nev., 1899–1908.
- Truckee River at Clarks, Nev., 1907–
- Truckee River at Derby dam, Nev., 1907–1910.
- Truckee River near Wadsworth, Nev., 1902–1905.
- Lake Winnemucca inlet near Wadsworth, Nev., 1902–1905.
  - Donner Creek at Donner Lake, near Truckee, Cal., 1909–10.
  - Donner Creek near Truckee, Cal., 1902–
  - Prosser Creek near Hobart Mills (Truckee), Cal., 1903–4; 1907–1912.
  - Prosser Creek near Boca, Cal., 1899–90; 1902–3.
    - South Fork of Prosser Creek near Truckee, Cal., 1909–10.
  - Little Truckee River near Truckee, Cal., 1909–10.
  - Little Truckee River near Boca, Cal., 1890.
  - Little Truckee River at Boca, Cal., 1911–

- Truckee River tributaries—Continued.
    - Little Truckee River at Pine Station and Starr, Cal., 1903–1910.
        - Webber Creek near Truckee, Cal., 1909–10.
        - Independence Creek below Independence Lake, Cal., 1902–1907.
        - Independence Creek near Truckee, Cal., 1909–10.
    - Steamboat Creek at Steamboat Springs, Nev., 1900–1901.
        - Galena Creek near Washoe, Nev., 1913–14.

HONEY LAKE BASIN.

- Susan River near Susanville, Cal., 1900–1905; 1913.
    - Gold Run Creek near Susanville, Cal., 1913; 1915–
    - Lassen Creek near Susanville, Cal., 1913; 1915–
    - Willow Creek at Merrillville, Cal., 1904–5.
    - Willow Creek near Standish, Cal., 1900–1901; 1905.
- Baxter Creek near Janesville, Cal., 1913–1915.
    - Schloss Creek at Janesville, Cal., 1915.
    - Janesville Creek at Janesville, Cal., 1913; 1915.

SURPRISE VALLEY DRAINAGE BASIN.

- Bidwell Creek near Fort Bidwell, Cal., 1912.

WARNER LAKES BASIN.

- Cowhead Lake near Fort Bidwell, Cal., 1911–1913.
- Twentymile Creek near Warner Lake, Oreg., 1910–
    - Fifteenmile Creek above Twelvemile Creek, near Fort Bidwell, Cal., 1913.
    - Fifteenmile Creek below Rock Creek, near Fort Bidwell, Cal., 1913.
        - Twelvemile Creek near Fort Bidwell, Cal., 1912–13.
    - Rock Creek near Fort Bidwell, Cal., 1913.
- Deep Creek near Fort Bidwell, Cal., 1913.
- Deep Creek at Big Valley, near Lakeview, Oreg., 1911–
- Deep Creek at Adel, Oreg., 1909–
    - Dismal Creek near Fort Bidwell, Cal., 1913.
    - Camas Creek near Plush, Oreg., 1911–12.
    - Camas Creek below Blue Creek, near Lakeview, Oreg., 1912–
        - Mud Creek near Plush, Oreg., 1911–12; 1915.
        - Crane Creek near Lakeview, Oreg., 1914.
        - Drake Creek near Adel, Oreg., 1915.
        - M. C.-Givan ditch near Adel, Oreg., 1915–
        - Company ditch near Adel, Oreg., 1915–
- Fish Creek near Plush, Oreg., 1914.
- Honey Creek at Chalstrand's ranch, near Plush, Oreg., 1910–11.
- Honey Creek near Plush, Oreg., 1909–1914; 1915.
    - Twelvemile Creek near Plush, Oreg., 1911.
    - Snyder Creek near Plush, Oreg., 1911.
- Pelican Lake near Adel, Oreg., 1913–1915.
- Crump Lake near Adel, Oreg., 1910–1912; 1913; 1914; 1915.
- Hart Lake near Plush, Oreg., 1910–
- Flagstaff Lake inlet near Plush, Oreg., 1914.
- Flagstaff Lake near Plush, Oreg., 1910–
- Lower Campbell Lake near Plush, Oreg., 1914; 1915.
- Stone Corral Lake near Plush, Oreg., 1914; 1915.
- Bluejoint Lake near Plush, Oreg., 1911–

ABERT LAKE BASIN.

- Chewaucan River at dam site, near Paisley, Oreg., 1912–
- Chewaucan River above Mill Creek, near Paisley, Oreg., 1912–
- Chewaucan River at Chewaucan Land & Cattle Co.'s gage, near Paisley, Oreg., 1914–
- Chewaucan River above Conn's ditch, near Paisley, Oreg., 1912.
- Chewaucan River at Paisley, Oreg., 1905–1907; 1909–1912; 1913.
- Chewaucan River at Hotchkiss Ford, near Paisley, Oreg., 1914–
- Chewaucan River at Narrows, near Paisley, Oreg., 1914–
  - Conn ditch near Paisley, Oreg., 1914–
  - Smalls Creek at Paisley, Oreg., 1914–
  - Bagley ditch at Paisley, Oreg., 1914–
  - Jones-Innis-ZX ditch near Paisley, Oreg., 1914–
  - Crooked Creek near Valley Falls, Oreg., 1912–13.

SUMMER LAKE BASIN.

- Ana River near Summer Lake, Oreg., 1905; 1909–10.

SILVER LAKE BASIN.

- Silver Creek near Silver Lake, Oreg., 1904–1907; 1909–
  - Bridge Creek near Silver Lake, Oreg., 1905–6; 1911–12.
- Buck Creek near Silver Lake, Oreg., 1905–6; 1909–1911.

MALHEUR AND HARNEY LAKES BASIN.

- Malheur Lake outlet at Narrows, Oreg., 1903–1906; 1911–12; 1913; 1914.
  - Silvies River near Silvies, Oreg., 1903–1905; 1909–1912.
  - Silvies River near Burns, Oreg., 1903–1906; 1909–
  - Donner und Blitzen River near Diamond, Oreg., 1909–
  - Donner und Blitzen River near Narrows, Oreg., 1915.
    - Mud Creek near Diamond, Oreg., 1911–
    - Bridge Creek near Diamond, Oreg., 1911; 1912–
    - Krumbo Creek near Diamond, Oreg., 1911; 1913.
    - Keiger Creek near Diamond, Oreg., 1909–10; 1911; 1912–13.
      - Cucamonga Creek near Diamond, Oreg., 1911–1913.
      - McCoy Creek near Diamond, Oreg., 1909–1914.
  - Riddle Creek near Smith, Oreg., 1911.
  - Buena Vista canal near Narrows, Oreg., 1915.
  - Silver Creek above Riley, Oreg., 1904–1906; 1909; 1910; flood periods 1911–1915.
  - Silver Creek below Riley, Oreg., 1912; 1913; 1914.

ALVORD LAKE BASIN.

- Trout Creek near Denio, Oreg., 1911–12.
- Little Cottonwood Creek near Denio, Oreg., 1911–12.

TUMTUM LAKE BASIN.

- Van Horn Creek near Denio, Oreg., 1911.

CATLOW VALLEY, DRAINAGE BASIN.

- Home Creek near Beckley (Narrows), Oreg., 1911; 1912; 1915.

REPORTS ON WATER RESOURCES OF THE GREAT BASIN.

PUBLICATIONS OF THE UNITED STATES GEOLOGICAL SURVEY.

WATER-SUPPLY PAPERS.

Water-supply papers are distributed free by the Geological Survey as long as its stock lasts. An asterisk (*) indicates that this stock has been exhausted. Many of the papers marked in this way may, however, be purchased (at price noted) from the Superintendent of Documents, Washington, D. C. Omission of the price indicates that the report is not obtainable from Government sources. Water-Supply Papers are of octavo size.

*7. Seepage water of northern Utah, by Samuel Fortier. 1897. 50 pp., 3 pls. 10c.

Describes Cache Valley and its water supply and seepage waters in Ogden Valley.

*43. Conveyance of water in irrigation canals, flumes, and pipes, by Samuel Fortier. 1901. 86 pp., 15 pls. 15c.

Describes the location and construction of various types of canals for irrigation.

*44. Profiles of rivers in the United States, by Henry Gannett. 1901. 100 pp., 11 pls. 15c.

Gives elevations and distances along Sevier, Bear, and Humboldt rivers; also brief descriptions.

*57. Preliminary list of deep borings in the United States, Part I (Alabama-Montana), by N. H. Darton. 1902. 60 pp. 10c.

*61. Preliminary list of deep borings in the United States, Part II (Nebraska-Wyoming), by N. H. Darton. 1902. 67 pp. 5c.

A second, revised, edition of Nos. 57 and 61 was published in 1905 as Water-Supply Paper 149 (q. v.).

68 Water storage in the Truckee Basin, California-Nevada, by L. H. Taylor. 1902. 90 pp., 8 pls. 10c.

Discusses reservoir sites, water rights for power and irrigation, irrigable lands, duty of water, and necessity for national control of water.

*78. Preliminary report on artesian basins in southwestern Idaho and southeastern Oregon, by I. C. Russell. 1903. 53 pp., 2 pls. 5c.

Discusses briefly the rocks and geologic structure of a part of the Snake River Plains in Canyon and Owyhee counties, Idaho, and Malheur and Harney counties, Oreg.; describes briefly the conditions on which artesian flow depends, and in some detail the springs and drilled wells in the Lewis, Otis, Harney, and Whitehorse artesian basins; also describes artesian wells in alluvial deposits and discusses the size of drill holes, casings, etc., the preservation of well records, and the importance of laws to govern the use of artesian waters; gives list of publications bearing on artesian waters.

*81. California hydrography, by J. B. Lippincott. 1903. 488 pp., 1 pl. 25c.

A collection of published records of stream flow "hitherto much scattered, some of them out of print and difficult to secure," brought together as a book of reference.

140. Field measurements of the rate of movement of underground waters, by C. S. Slichter. 1905. 122 pp., 15 pls. 15c.

Discusses flow in Rio Hondo, San Gabriel, and Mohave River valleys, Cal.; gives results of tests of wells and pumping plants, and describes stovepipe method of well construction.

*103. A review of the laws forbidding pollution of inland waters in the United States, by E. B. Goodell. 1904. 130 pp. Superseded by Water-Supply Paper 152.

Cites statutory restrictions of water pollution in California, Idaho, Nevada, Oregon, Utah, and Wyoming.

*122. Relation of the law to underground waters, by D. W. Johnson. 1905. 55 pp. 5c.

Cites legislative acts affecting ground waters in California, Idaho, Nevada, Oregon, Utah, and Wyoming.

146. Proceedings of second conference of engineers of the Reclamation Service, with accompanying papers, compiled by F. H. Newell, chief engineer. 1905. 267 pp. 15c. [Inquiries concerning this report should be addressed to the Reclamation Service.] Contains:

A brief report on "Hydrographic investigations in Nevada," by A. E. Chandler. Gives notes concerning fluctuations and average discharge at stations on Truckee, Humboldt, Carson, and Walker rivers.

A report on "Underground waters of southern California," by W. C. Mendenhall. Discusses the origin, distribution, and character of the artesian waters, the causes of fluctuations in the supply, and the need of moderation in use.

149. Preliminary list of deep borings in the United States, second edition, with additions, by N. H. Darton. 1905. 175 pp. 10c.

Gives by States (and within the States by counties), location, depth, diameter, yield, height of water, and other information concerning wells 400 feet or more in depth; includes all wells listed in Water-Supply Papers 57 and 61; mentions also principal publications relating to deep borings.

152. A review of the laws forbidding pollution of inland waters in the United States (second edition), by E. B. Goodell. 1905. 149 pp. 10c.

Cites statutory restrictions of water pollution in California, Idaho, Nevada, Oregon, Utah, and Wyoming.

*157. Underground water in the valleys of Utah Lake and Jordan River, Utah, by G. B. Richardson. 1906. 81 pp., 9 pls. 20c.

Discusses the source, distribution, recovery, and quality of waters; contains list of typical wells.

*162. Destructive floods in the United States in 1905, with a discussion of flood discharge and frequency and an index to flood literature, by E. C. Murphy and others. 1906. 105 pp., 4 pls. 15c.

Gives estimates of flood flow and frequency of Bear River at Collinston, Utah, and Humbodlt River at Golconda, Nev. (p. 85).

*181. Geology and water resources of Owens Valley, Cal., by W. T. Lee. 1906. 28 pp., 6 pls. 15c.

Discusses artensian conditions, utilization of ground waters by pumping and power plants, and undrained lakes as registers of climate. See also Water-Supply Paper 294.

*199. Underground water in Sanpete and central Sevier valleys, Utah, by G. B. Richardson. 1907. 63 pp., 6 pls. 25c.

Describes topography and geology of the area, the sources, distribution, recovery, and quality of the ground waters; presents tabulated data concerning springs and wells.

*217. Water resources of Beaver Valley, Utah, by W. T. Lee. 1908. 57 pp., 1 pl. 10c.

Describes possible development of surface and ground waters, and quality of waters; contains field assays of well water, and sanitary and other exact analyses.

*220. Geology and water resources of a portion of south-central Oregon, by G. A. Waring. 1908. 86 pp., 10 pls. 20c.

Describes the rocks, streams, lakes and lake valleys, deep and shallow wells, climate, soils, vegetation, industries, and reclamation projects in Lake County; gives analyses of soils and waters.

*224. Some desert watering places in southeastern California and southwestern Nevada, by W. C. Mendenhall. 1909. 98 pp., 4 pls. 20c.

Describes physical features of the Colorado and Mohave deserts and the Death Valley region, mineral resources and industrial development, climate, rivers, springs, and camping places; gives hints on desert traveling; describes main routes of travel, and gives details concerning the springs.

*225. Ground waters of the Indio region, California, with a sketch of the Colorado Desert, by W. C. Mendenhall. 1909. 56 pp., 12 pls. 20c.

Describes the structural features and deposits of the Colorado Desert, rainfall and drainage, the origin, source, character, and development of ground waters; gives history of development of the Indio region, and discusses soils, crops, and cost of reclamation.

*231. Geology and water resources of the Harney Basin region, Oregon, by G. A. Waring. 1909. 93 pp., 5 pls. 25c.

Describes topography, climate, vegetation, settlements and industries, the rocks and their succession, lakes, springs, and streams, and artesian conditions; discusses conservation of water supply, temperature of ground waters, and well-drilling methods; describes in detail Harney, Catlow, Alvord, and Whitehorse basins, and Malheur River basin.

237. The quality of the surface waters of California, by Walton Van Winkle and F. M. Eaton. 1910. 142 pp., 1 pl. 20c.

Describes geography, climate, industrial development, and drainage, and gives results of mineral analyses of the river waters.

274. Some stream waters of the Western United States, with chapters on sediment carried by the Rio Grande and the industrial application of water analyses, by Herman Stabler. 1911. 188 pp. 15c.

Describes collection of samples, plan of analytical work and methods of analyses; discusses soap-consuming power of waters, water softening, boiler waters, and water for irrigation; gives results of analyses of waters of Carson, Truckee, and Owens rivers.

277. Ground water in Juab, Millard, and Iron counties, Utah, by O. E. Meinzer. 1911. 162 pp., 5 pls. 25c.

Describes the physiographic features, geologic formations, and history, the rainfall, soil, vegetation, streams, and industrial development; discusses the occurrence of ground water in the bedrock and in unconsolidated sediments, artesian conditions and springs, the quality of the ground waters, irrigation, construction of wells, and watering places on routes of travel; describes in detail Juab Valley and Round, Little, Sage, Dog, and Fernow valleys, Tintic Valley and Tintic mining district, Pavant and Lower Beaver valleys, Old River Bed and Cherry Creek region, Drum and Swasey Wash region, Sevier Desert, Wah Wah Valley, Sevier Lake bottoms, White, Fish Springs, Snake, Parowan, and Rush Lake valleys, and Escalante Desert; analyses.

278. Water resources of Antelope Valley, Cal., by H. R. Johnson. 1911. 92 pp., 7 pls. 25c.

Describes topography, drainage, climate, physiography, and the water-bearing and nonwater-bearing rocks of areas in Kern, Los Angeles, and San Bernardino counties; discusses the influence of rainfall on the surface and ground waters, the artesian water and nonartesian water, bedrock springs, chemical character (analyses, alkali, dissolved solids, hygienic conditions), fallacies as to origin and quantities of artesian water, and the present and future development of the underground supplies.

294. An intensive study of the water resources of a part of Owens Valley, Cal., by C. H. Lee. 1912. 135 pp., 30 pls. 55c.

Describes topography, drainage, and structure of the valley, and discusses precipitation, stream flow, evaporation, percolation, and ground waters; bibliography.

297. Gazetteer of surface waters of California, Pt. III: Pacific coast and Great Basin streams, by B. D. Wood. 1913. 244 pp. 20c.

Contains description of streams and lakes of the Great Basin in California.

*300. Water resources of California, Pt. III: Stream measurements in the Great Basin and Pacific coast river basins, by H. D. McGlashan and H. J. Dean. 1913. 956 pp., 4 pls. 55c.

Describes the general features of the Great Basin in California, the Great Basin lakes in California and Nevada and gives results of stream-flow investigations available up to September 30, 1912.

333. Ground water in Box Elder and Tooele counties, Utah, by Everett Carpenter. 1913. 90 pp., 2 pls. 10c.

338. Springs of California, by Gerald A. Waring. 1915. 410 pp., 13 pls. 60c.

Describes briefly the pyhical features of California, including the coast ranges, Great Central Valley, the lava-covered region, the Sierra Nevada, the southeastern desert, and faults; defines "mineral water" and "pure water;" discusses source and amount of substances in waters, degree of concentration of natural waters and their properties, and the therapeutic value, temperature, and classification of mineral waters. The springs are described under the headings "hot," "carbonated," "sulphur," "saline," "magnesic," "iron," "artesian," "large cold," and "minor perennial" springs.

350. Profile surveys in Bear River basin, Idaho, prepared under the direction of R. B. Marshall, chief geographer. 1914. 7 pp., 6 pls. 10c.

Contains a brief description of Bear River basin and a list of the gaging stations that have been maintained and mentions publications containing the results of measurements of stream flow in the basin. The maps show not only the outlines of the river banks, the islands, the positions of rapids, falls, shoals, and existing dams, and the crossings of all ferries and roads, but the contours of banks to an elevation high enough to indicate the possibility of using the stream for the development of power by low or medium heads.

363. Quality of the surface waters of Oregon, by Walton Van Winkle. 1914. 137 pp., 2 pls. 20c.

Gives the results of an investigation made in cooperation with the State of Oregon "to determine the chemical composition of the waters of said State for a period of 14 months from" July 1, 1911. Describes the natural features of Oregon, discusses water for domestic and industrial uses, purification of water, and gives the results of analyses of waters of streams tributary to the Pacific and of a number of those discharging into the Great Basin; gives an outline of the geological history of the Great Basin, and brief descriptions of the general features of the Harney, Warner Lakes, Alkali Lake, Christmas Lake, and Chewaucan basins.

364. Water analyses from the laboratory of the United States Geological Survey, tabulated by F. W. Clarke, chief chemist. 1914. 40 pp. 5c.

Contains analyses of waters of rivers, lakes, wells, and springs in Utah, Nevada, California, and Oregon, and of mine waters from Tintic, Utah, and Tonopah and Kimberly, Nev.

365. Ground water in southeastern Nevada, by Everett Carpenter. 1915. 86 pp., 5 pls. 15c.

Describes an area in Clark, Lincoln, White Pine, and Nye counties drained in part by streams tributary to Colorado River and in part by streams discharging into the Great Basin. Discusses stream, lake, and wind topography, vegetation, crops, and industrial development, rainfall, occurrence of water in bedrock and unconsolidated sediments, source and permanence of artesian waters, and character and distribution of springs; also the quality of waters for domestic use and for irrigation, and gives analyses. Gives details of water supply by areas in Las Vegas and Virgin river basins and the Great Basin. Gives information in regard to watering places on routes of travel.

370. Surface water supply of Oregon, 1878–1910, by F. F. Henshaw and H. J. Dean. 1915. 829 pp., 1 pl. 45c.

Contains information pertaining to the surface waters of Oregon collected by the United States Geological Survey and cooperating parties from 1878 to September 30, 1910.

*375. Contributions to the hydrology of the United States, 1915; Nathan C. Grover, chief hydraulic engineer, 1916. 181 pp., 9 pls. 15c. Contains:

(*d*) Ground water in Big Smoky Valley, Nev., by O. E. Meinzer, pp. 85–116, pls. 6–7. Describes a typical Nevada desert valley—a plain hemmed in by mountain ranges and underlain by porous rock waste eroded from these ranges and saturated with water discharged from them. This valley was selected for investigation not because it afforded exceptional opportunity for the utilization of ground waters, but because it was considered more or less typical of the undeveloped valleys of the State. Preliminary report. See 423.

420. Profile surveys along Henrys Fork, Idaho, and Logan River and Blacksmith Fork, Utah, prepared under the direction of W. H. Herron, acting chief geographer. 1916. 8 pp., 10 pls. 10c.

Contains a brief description of the general features of Logan River basin and a list of the gaging stations that have been maintained in the basin. The maps show not only the outlines of the river banks, the islands, the positions of rapids, falls, shoals, and existing dams, and the crossings of all ferries and roads, but the contours of banks to an elevation high enough to indicate the possibility of using the stream for the development of power by low or medium heads.

423. Geology and water resources of Big Smoky, Clayton, and Alkali Spring valleys, Nevada, by Oscar E. Meinzer. 1917. 167 pp., 15 pls. 30c.

Covers in detail the area described briefly in Water-Supply Paper 375 (*d*) and two small adjoining areas.

425. Contributions to the hydrology of the United States, 1917; N. C. Grover, chief hydraulic engineer. 1918. Contains:

(*d*) Ground water in Reese River basin and adjacent parts of Humboldt River basin, Nevada, by G. A. Waring.

ANNUAL REPORTS.

Each of the papers contained in the annual reports was also issued in separate form.

Annual reports are distributed free by the Geological Survey as long as its stock lasts. An asterisk (*) indicates that this stock has been exhausted. Many of the papers so marked, however may be purchased from the SUPERINTENDENT OF DOCUMENTS, WASHINGTON, D. C.

* Third Annual Report of the United States Geological Survey, 1881–82, J. W. Powell, Director. 1883. xviii, 564 pp., 67 pls. $2.35. Contains:

* Sketch of the geological history of Lake Lahontan, by I. C. Russell, pp. 189–235, pls. 18–23. Describes the physical features of the Great Basin.

* Fourth Annual Report of the United States Geological Survey, 1882–83, J. W. Powell, Director. 1884. xxxii, 473 pp., 85 pls. $1.65. Contains:

* A geological reconnaissance in southern Oregon, by I. C. Russell, pp. 431–464, pls. 83–85. Describes the interior drainage of southern Oregon; discusses the area, extent, quality of waters, and recent changes in the existing lakes.

* Eighth Annual Report of the United States Geological Survey, 1886–87, J. W. Powell, Director. 1889. 2 parts. * Part I, xix, 474, viii pp., pls. 76. $1.50. Contains:

* The Quaternary history of Mono Valley, Cal., by I. C. Russell, pp. 261–394, pls. 16–44. Describes the physiographic features and drainage of the Mono Lake basin, the sources of water supply of the present lake, including streams and springs, and discusses the chemical composition of the water and the fluctuations in lake level.

* Tenth Annual Report of the United States Geological Survey, 1888–89, J. W. Powell, Director. 1890. 2 parts. *Pt. II. Irrigation, viii, 123 pp. 35c.

Makes a preliminary report on the organization and prosecution of the survey of the arid lands for purposes of irrigation; includes an account of the methods of topographic and hydraulic work, the segregation work on reservoir sites and irrigable lands, fields and office methods, and brief descriptions of the topography of some of the river basins.

Eleventh Annual Report of the United States Geological Survey, 1889–90, J. W. Powell, Director. 1891. 2 parts. Pt. II. Irrigation, xiv, 395 pp., 30 plates and maps. $1.25. Contains:

*Hydrography, pp. 1–110. Discusses scope of work, methods of stream measurement, rainfall and evaporation, and describes the more important streams.

*Engineering, pp. 111–200. Defines the scope of the work and gives an account of the surveys in the Sun River basin and in the Arkansas, Rio Grande, California, Lahontan, Utah, and Snake River divisions.

* The arid lands, pp. 201–289. Includes statements of the Director to the House Committee on Irrigation and extracts from the constitutions of States relating to irrigation.

*Topography, pp. 291–343. Comprises reports of the topographic surveys in California, Nevada, Colorado, Idaho, Montana, and New Mexico, and a report on reservoir sites.

*Irrigation literature, pp. 345–388. Gives a list of books and pamphlets on irrigation and allied subjects, mainly contained in the library of the United States Geological Survey.

Twelfth Annual Report of the United States Geological Survey, 1890–91, J. W. Powell, Director. 1891. 2 parts, Pt. II. Irrigation, xviii, 576 pp., 93 pls. $2.00. Contains:

*Report upon the location and survey of reservoir sites during the fiscal year ending June 30, 1891, by A. H. Thompson, pp. 1–212, pls. 54–57. Describes reservoir sites in Carson River basin at Red Lake, Pleasant Valley, Mountain Bullion, Indian Pool, Heenan Lake, Silver King Valley, Wolf Creek, Dumonts Meadow, all in Alpine County, along Rush Creek, in Hulls Meadow, on Little Truckee River, at Twin Valley on the North Fork of Prosser Creek, at Monument Peak, at Grass Lake, and at Hope Valley, in California, and on Truckee River, Nev.; for each reservoir site gives the location, height of dam, area inclosed by contour, approximate contents of reservoir, position of irrigable lands and areas of segregated lands.

Thirteenth Annual Report of the United States Geological Survey, 1891–92, J. W. Powell, Director. 1892. (Pts. II and III, 1893.) 3 parts. Pt. III, Irrigation, xi, 486 pp., 77 pls. $1.85. Contains:

*Engineering results of irrigation survey, by H. M. Wilson, pp. 351–427, pls. 147–182. Describes Donner Lake, Independence Lake, and Webber Lake reservoirs, also Truckee canals in the Truckee River system, and Long Valley and Hope Valley reservoirs in the Carson River basin, Nev.

Report upon the location and survey of reservoir sites during the fiscal year ending June 30, 1892, by A. H. Thompson, pp. 451–478. Describes Bear Lake reservoir site (Utah-Idaho), Silver Lake, Twin Lakes, and Marys Lake sites, and sites on Sanpitch, Sevier, East Fork of Sevier, Otter Creek, Panquitch Lake, and at Blue Spring, Utah.

Sixteenth Annual Report of the United States Geological Survey, 1894–95, Charles D. Walcott, Director. 1896. (Pts. II, III, and IV, 1895.) 4 parts. *Pt. II. Papers of an economic character, xix, 598 pp., 43 pls. $1.25. Contains:

The public lands and their water supply, by F. H. Newell, pp. 457–533, pls. 35–39. Describes general character of the public lands, the lands disposed of (railroad lands grant, and swamp lands, and private miscellaneous entries), lands reserved (Indian, forest, and military reservations), the vacant lands, and the rate of disposal of vacant lands; discusses the streams, wells, and reservoirs as sources of water supply; gives details for each State.

Eighteenth Annual Report of the United States Geological Survey, 1896–97, Charles D. Walcott, Director. 1897. (Pts. II and III, 1898.) 5 parts in 6 vols. *Pt. IV, Hydrography, x, 756 pp., 102 pls. $1.75. Contains:

*Reservoirs for irrigation, by J. D. Schuyler, pp. 617–740, pls. 47–102. Discusses proposed Rock Creek reservoir on Humboldt River, Nev.; gives tables of reservoir capacities and areas; describes proposed reservoir of Antelope Valley Water Co., California, and on Rock Creek, Humboldt River basin, Nev.

Twentieth Annual Report of the United States Geological Survey, 1898–99, Charles D. Walcott, Director. 1899. (Pts. II, III, IV, V, and VII, 1900.) 7 parts in 8 vols, and separate case for maps with Pt. V. *Pt. V, Forest Reserves, xix, 498 pp., 159 pls., 8 maps in separate case. $2.80. Contains:

*The San Gabriel Forest Reserve, by J. B. Leiberg, pp. 411–428, pls. 143–146.
The San Bernardino Forest Reserve, by J. B. Leiberg, pp. 429–454, pls. 147–153.
The San Jacinto Forest Reserve, by J. B. Leiberg, pp. 455–478, pls. 154–159.
Describes general topographic features of forest reserves and drainage, part of which is by streams tributary to the Pacific, and part by streams that are lost in the sands of the Mohave and other deserts.

MONOGRAPHS.

Monographs are of quarto size. They are not distributed free but may be obtained from the Geological Survey at the prices indicated. An asterisk (*) indicates that the Survey's stock of the paper is exhausted.

I. Lake Bonneville, by G. K. Gilbert. 1890. xx, 438 pp., 51 pls., 1 map. $1.50.

Contains in the introduction a description of the Great Basin; describes the present lakes and their oscillations, and gives analyses of the waters of Great Salt Lake and of fresh waters in the Salt Lake Basin.

XI. Geological history of Lake Lahontan, a Quaternary lake of northwestern Nevada, by I. C. Russell. 1885. xiv, 288 pp., 46 pls. $1.75.

Contains descriptions of the present rivers and lakes; discusses the chemical deposits of the area and gives analyses showing the composition of the principal rivers and lakes of the Lahontan Basin.

BULLETINS.

An asterisk (*) indicates that the Geological Survey's stock of the paper is exhausted. Many of the papers so marked may be purchased from the SUPERINTENDENT OF DOCUMENTS, WASHINGTON, D. C. Bulletins are of octavo size.

252. Preliminary report on the geology and water resources of central Oregon, by I. C. Russell. 1905. 138 pp., 24 pls. 15c.

Describes a portion of the extreme northern part of the Great Basin and a part of the drainage area of Deschutes River and its principal tributary, Crooked River; gives an account of the topography, drainage, rainfall, and temperature, winds, and forests; describes the volcanic and sedimentary rock formations, and discusses, by counties, the geology and topography, the surface and underground waters; treats of artesian conditions in the Deschutes basin and makes suggestions concerning artesian well records.

*264. Record of deep-well drilling for 1904, by M. L. Fuller, E. F. Lines, and A. C. Veatch. 1905. 106 pp. 10c.

Discusses the importance of accurate well records to the driller, to owners of oil, gas, and water wells, and to geologists; describes the general methods of work; gives tabulated records of wells in Utah.

*298. Record of deep-well drilling for 1905, by M. L. Fuller and Samuel Sanford. 1906. 299 pp. 25c.

Gives an account of progress in the collection of well records and samples; contains tabulated records of wells in California, Idaho, Nevada, Oregon, and Utah; and detailed record of well at Salt Lake City, Utah. The well of which a detailed section is given was selected because it affords valuable stratigraphic information.

GEOLOGIC FOLIOS.

Under the plan adopted for the preparation of a geologic map of the United States the entire area is divided into small quadrangles, bounded by certain meridians and parallels, and these quadrangles, which number several thousand, are separately surveyed and mapped. The unit of survey is also the unit of publication, and the maps and description of each quadrangle are issued in the form of a folio. When all the folios are completed they will constitute the Geologic Atlas of the United States.

A folio is designated by the name of the principal town or of a prominent natural feature within the quadrangle. Each folio includes maps showing the topography, geology, underground structure, and mineral deposits of the area mapped and several pages of descriptive text. The text explains the maps and describes the topographic and geologic features of the country and its mineral products. The topographic map shows roads, railroads, waterways, and, by contour lines, the shapes of the hills and valleys and the height above sea level of all points in the quadrangle. The areal-geology map shows the distribution of the various rocks at the surface. The structural-geology map shows the relations of the rocks to one another underground. The economic-geology map indicates the location of mineral deposits that are commercially valuable. The artesian-water map shows the depth to underground-water horizons. Economic-geology and artesian-water maps are included in folios if the conditions in the areas mapped warrant their publication. The folios are of special interest to students of geography and geology and are valuable as guides in the development and utilization of mineral resources.

The folios numbered from 1 to 163, inclusive, are published in only one form (18 by 22 inches), called the library edition. Some of the folios that bear numbers higher than 163 are published also in an octavo edition (6 by 9 inches). Owing to a fire in the Geological Survey building May 18, 1913, the stock of geologic folios was more or less damaged by fire and water, but 80 or 90 per cent of the folios are usable. They will be sold at the uniform price of 5 cents each, with no reduction for wholesale orders. This rate applies to folios in stock from 1 to 184, inclusive, also to the library edition of folio 186. The library edition of folios 185, 187, and higher numbers sell for 25 cents a copy, except that some folios which contain an unusually large amount of matter, sell for 50 cents a copy. The octavo edition of folio 185 and higher numbers sells for 50 cents a copy. If 34 folios selling at 25 cents each (or their equivalent in higher-priced folios) are ordered at one time a discount of 40 per cent is allowed; $5.10 is the minimum amount accepted at this rate.

All folios contain descriptions of the drainage of the quadrangles.

*39. Truckee folio, California.

> Describes the general and economic geology of an area extending westward and northward from Truckee Lake, drained by streams a part of which flow through Yuba and American rivers to the Sacramento, and part through Lake Tahoe to the Great Basin, discusses the topography and geology, and under "Economic geology" the mineral springs which occur abundantly throughout the area.

MISCELLANEOUS REPORTS.

Other Federal bureaus and State and other organizations have from time to time published reports relating to the water resources of various sections of the country. Notable among those pertaining to the Great Basin are the reports of the Reclamation Board, the State engineer and surveyor, the State Conservation Commission of California, the reports of the State engineers of Idaho, Oregon, Utah, and Wyoming, the biennial reports of the Bureau of Industry, Agriculture, and Irrigation of Nevada, and the annual reports of the United States Reclamation Service.

The following reports deserve special mention:

Oregon system of water titles, by John H. Lewis: Oregon State Engineer Bull. 2, 1912.

State and national water laws, with detailed statement of the Oregon system of water titles, by John H. Lewis, with a discussion by Messrs. Clarence T. Johnston and L. J. Conte: Am. Soc. Civil Eng Trans., vol. 76, pp. 637–758. 1913.

Irrigation pumping in Nevada, etc., by Charles Norcross: Nevada Bureau of Industry, Agriculture, and Irrigation Bull. 8, 1913.

Report of irrigation investigations in Utah, under the direction of Elwood Mead: U. S. Dept. Agr. Office Exper. Sta. Bull. 124, 1903.

How to appropriate the public waters of the State of Nevada, compiled by W. M. Kearney, State engineer, 1911.

Requirements and regulations, including suggestions and instructions in relation to the appropriation, use, and measurement of water in the State of Nevada: State engineer of Nevada, 1912.

GEOLOGICAL SURVEY HYDROLOGIC REPORTS OF GENERAL INTEREST.

The following list comprises reports not readily classifiable by drainage basins and covering a wide range of hydrologic investigations:

WATER-SUPPLY PAPERS.

*1. Pumping water for irrigation, by H. M. Wilson. 1896. 57 pp., 9 pls.

Describes pumps and motive powers, windmills, water wheels, and various kinds of engines, also storage reservoirs to retain pumped water until needed for irrigation.

*3. Sewage irrigation, by G. W. Rafter. 1897. 100 pp., 4 pls. 10c. (See Water-Paper 22.)

Discusses methods of sewage disposal by intermittent filtration and by irrigation; describes utilization of sewage in Germany, England, and France, and sewage purification in the United States.

*8. Windmills for irrigation, by E. C. Murphy. 1897. 49 pp., 8 pls. 10c.

Gives results of experimental tests of windmills during the summer of 1896 in the vicinity of Garden, Kans.; describes instruments and methods and draws conclusions.

*14. New tests of certain pumps and water lifts used in irrigation, by O. P. Hood. 1898. 91 pp., 1 pl.

Discusses efficiency of pumps and water lifts of various types.

*20. Experiments with windmills, by T. O. Perry. 1899. 97 pp., 12 pls. 15c.

Includes tables and descriptions of wind wheels, compares wheels of several types, and discusses results.

*22. Sewage irrigation, Part II, by G. W. Rafter. 1899. 100 pp., 7 pls. 15c.

Gives résumé of Water-Supply Paper 3; discusses pollution of certain streams, experiments on purification of factory wastes in Massachusetts, value of commercial fertilizers, and describes American sewage-disposal plants by States; contains bibliography of publications relating to sewage utilization and disposal.

*41. The windmill; its efficiency and economic use, Part I, by E. C. Murphy. 1901. 72 pp., 14 pls. 5c.

*42. The windmill; its efficiency and economic use, Part II, by E. C. Murphy. 1901. 75 pp. (73–147), 2 pls. (15–16). 10c.

Nos. 41 and 42 give details of results of experimental tests with windmills of various types.

*43. Conveyance of water in irrigation canals, flumes, and pipes, by Samuel Fortier. 1901. 86 pp., 15 pls. 15c.

*56. Methods of stream measurement. 1901. 51 pp., 12 pls. 15c.

Describes the methods used by the Survey in 1901–2. See also Nos. 64, 94, and 95.

*64. Accuracy of stream measurements, by E. C. Murphy. 1902. 99 pp., 4 pls. (See No. 95.) 10c.

Describes methods of measuring velocity of water and of measuring and computing stream flow and compares results obtained with the different instruments and methods; describes also experiments and results at the Cornell University hydraulic laboratory. A second, enlarged, edition published as Water-Supply Paper 95.

*67. The motions of underground waters, by C. S. Slichter. 1902. 106 pp., 8 pls. 15c.

Discusses origin, depth, and amount of ground waters; permeability of rocks and porosity of soils; causes, rates, and laws of motions of ground water; surface and deep zones of flow, and recovery of water by open wells and artesian and deep wells; treats of the shape and position of the water table; gives simple methods of measuring yield of flowing well; describes artesian wells at Savannah, Ga.

72. Sewage pollution in the metropolitan area near New York City and its effect on inland water resources, by M. O. Leighton. 1902. 75 pp., 8 pls. 10c.

Defines "normal" and "polluted" waters and discusses the damage resulting from pollution.

*80. The relation of rainfall to run-off, by G. W. Rafter. 1903. 104 pp. 10c.

Treats of measurements of rainfall and laws and measurements of stream flow; gives rainfall, run-off, and evaporation formulas; discusses effect of forests on rainfall and run-off.

87. Irrigation in India (second edition), by H. M. Wilson. 1903. 238 pp., 27 pls. 25c.

First edition was published in Part II of the Twelfth Annual Report.

93. Proceedings of first conference of engineers of Reclamation Service, with accompanying papers, compiled by F. H. Newell, chief engineer. 1904. 361 pp. 25c. [Requests for this report should be addressed to the U. S. Reclamation Service.]

Contains the following papers of more or less general interest:
Limits of an irrigation project, by D. W. Ross.
Relation of Federal and State laws to irrigation, by Morris Bien.
Electrical transmission of power for pumping, by H. A. Storrs.
Correct design and stability of high masonry dams, by Geo. Y. Wisner.
Irrigation surveys and the use of the plane table, by J. B. Lippincott.
The use of alkaline waters for irrigation, by Thomas H. Means.

*94. Hydrographic manual of the United States Geological Survey, prepared by E. C. Murphy, J. C. Hoyt, and G. B. Hollister. 1904. 76 pp., 3 pls. 10c.

Gives instruction for field and office work relating to measurements of stream flow by current meters. See also No. 95.

*95. Accuracy of stream measurements (second, enlarged, edition), by E. C. Murphy. 1904. 169 pp., 6 pls.

Describes methods of measuring and computing stream flow and compares results derived from different instruments and methods. See also No. 94.

*103. A review of the laws forbidding pollution of inland waters in the United States, by E. B. Goodell. 1904. 120 pp. (See No. 152.)

Explains the legal principles under which antipollution statutes become operative, quotes court decisions to show authority for various deductions, and classifies according to scope the statutes enacted in the different States.

110. Contributions to the hydrology of eastern United States, 1904; M. L. Fuller, geologist in charge. 1905. 211 pp., 5 pls. 10c.

Contains the following reports of general interest. The scope of each paper is indicated by its title.

Description of underflow meter used in measuring the velocity and direction of underground water, by Charles S. Slichter.

The California or "stovepipe" method of well construction, by Charles S. Slichter.

Approximate methods of measuring the yield of flowing wells, by Charles S. Slichter.

Corrections necessary in accurate determinations of flow from vertical well casings, from notes furnished by A. N. Talbot.

Experiment relating to problems of well contamination at Quitman, Ga., by S. W. McCallie.

113. The disposal of strawboard and oil-well wastes, by R. L. Sackett and Isaiah Bowman. 1905. 52 pp., 4 pls. 5c.

The first paper discusses the pollution of streams by sewage and by trade wastes, describes the manufacture of strawboard, and gives results of various experiments in disposing of the waste. The second paper describes briefly the topography, drainage, and geology of the region about Marion, Ind., the contamination of rock wells and of streams by waste oil and brine.

*114. Underground waters of eastern United States; M. L. Fuller, geologist in charge. 1905. 285 pp., 18 pls. 25c.

Contains report on "Occurrence of underground water," by M. L. Fuller, discussing sources, amount, and temperature of waters, permeability and storage capacity of rocks, water-bearing formations, recovery of water by springs, wells, and pumps, essential conditions of artesian flows, and general conditions affecting underground waters in eastern United States.

119. Index to the hydrographic progress reports of the United States Geological Survey, 1888 to 1903, by J. C. Hoyt and B. D. Wood. 1905. 253 pp. 15c.

Scope indicated by title.

120. Bibliographic review and index of papers relating to underground waters published by the United States Geological Survey, 1879–1904, by M. L. Fuller. 1905. 128 pp. 10c.

Scope indicated by title.

*122. Relation of the law to underground waters, by D. W. Johnson. 1905. 55 pp. 5c.

Defines and classifies underground waters, gives common-law rules relating to their use, and cites State legislative acts affecting them.

140. Field measurements of the rate of movement of underground waters, by C. S. Slichter. 1905. 122 pp., 15 pls. 15c.

Discusses the capacity of sand to transmit water, describes measurements of underflow in Rio Hondo, San Gabriel, and Mohave River valleys, Cal., and on Long Island, N. Y.; gives results of tests of wells and pumping plants, and describes stovepipe method of well construction.

143. Experiments of steel-concrete pipes on a working scale, by J. H. Quinton. 1905. 61 pp., 4 pls. 5c.

Scope indicated by title.

145. Contributions to the hydrology of eastern United States, 1905; M. L. Fuller, geologist in charge. 1905. 220 pp., 6 pls. 10c.

Contains brief reports of general interest as follows:

Drainage of ponds into drilled wells, by Robert E. Horton. Discusses efficiency, cost, and capacity of drainage wells, and gives statistics of such wells in southern Michigan.

Construction of so-called fountain and geyser springs, by Myron L. Fuller.

A convenient gage for determining low artesian heads, by Myron L. Fuller.

146. Proceedings of second conference of engineers of the Reclamation Service, with accompanying papers, compiled by F. H. Newell, Chief Engineer. 1905. 267 pp. 15c. [Inquiries concerning this report should be addressed to the U. S. Reclamation Service.]

Contains brief account of the organization of the hydrographic [water-resources] branch and the Reclamation Service, reports of conferences and committees, circulars of instruction, and many brief reports on subjects closely related to reclamation, and a bibliography of technical papers by members of the service. Of the papers read at the conference those listed below (scope indicated by title) are of more or less general interest.

Proposed State code of water laws, by Morris Bien.
Power engineering applied to irrigation problems, by O. H. Ensign.
Estimates on tunneling in irrigation projects, by A. L. Fellows.
Collection of stream-gaging data, by N. C. Grover.
Diamond-drill methods, by G. A. Hammond.
Mean-velocity and area curves, by F. W. Hanna.

146. Proceedings of second conference of engineers of the Reclamation Service—Continued.

Importance of general hydrographic data concerning basins of streams gaged, by R. E. Horton.
Effect of aquatic vegetation on stream flow, by R. E. Horton.
Sanitary regulations governing construction camps, by M. O. Leighton.
Necessity of draining irrigated land, by Thos. H. Means.
Alkali soils, by Thos. H. Means.
Cost of stream-gaging work, by E. C. Murphy.
Equipment of a cable gaging station, by E. C. Murphy.
Silting of reservoirs, by W. M. Reed.
Farm-unit classification, by D. W. Ross.
Cost of power for pumping irrigating water, by H. A. Storrs.
Records of flow at current-meter gaging stations during the frozen season, by F. H. Tillinghast.

147. Destructive floods in United States in 1904, by E. C. Murphy and others. 1905. 206 pp., 18 pls. 15c.

Contains a brief account of "A method of computing cross-section area of waterways," including formulas for maximum discharge and areas of cross section.

*150. Weir experiments, coefficients, and formulas, by R. E. Horton. 1906. 189 pp., 38 pls. (See Water-Supply Paper 200.) 15c.

Scope indicated by title.

151. Field assay of water, by M. O. Leighton. 1905. 77 pp., 4 pls.

Discusses methods, instruments, and reagents used in determining turbidity, color, iron, chlorides, and hardness in connection with the studies of the quality of water in various parts of the United States.

152. A review of the laws forbidding pollution of inland waters in the United States, second edition, by E. B. Goodell. 1905. 149 pp. 10c.

Scope indicated by title.

*155. Fluctuations of the water level in wells, with special reference to Long Island, N. Y., by A. C. Veatch. 1906. 83 pp., 9 pls. 25c.

Includes general discussion of fluctuations due to rainfall and evaporation, barometric changes, temperature changes, changes in rivers, changes in lake level, tidal changes, effects of settlement, irrigation, dams, underground water developments, and to indeterminate causes.

*160. Underground water papers, 1906; M. L. Fuller, geologist in charge. 1906. 104 pp., 1 pl.

Gives account of work in 1905, lists publications relating to underground waters, and contains the following brief reports of general interest:
Significance of the term "artesian," by Myron L. Fuller.
Representation of wells and springs on maps, by Myron L. Fuller.
Total amount of free water in the earth's crust, by Myron L. Fuller.
Use of fluorescein in the study of underground waters, by R. B. Dole.
Problems of water contamination, by Isaiah Bowman.
Instances of improvement of water in wells, by Myron L. Fuller.

*162. Destructive floods in the United States in 1905, with a discussion of flood discharge and frequency and an index to flood literature, by E. C. Murphy and others. 1906. 105 pp., 4 pls. 15c.

*163. Bibliographic review and index of underground-water literature published in the United States in 1905, by M. L. Fuller, F. G. Clapp, and B. L. Johnson. 1906. 130 pp. 15c.

Scope indicated by title.

*179. Prevention of stream pollution by distillery refuse, based on investigations at Lynchburg, Ohio, by Herman Stabler. 1906. 34 pp., 1 pl. 10c.

Describes grain distillation, treatment of slop, sources, character, and effects of effluents on streams; discusses filtration, precipitation, fermentation, and evaporation methods of disposal of wastes without pollution.

*180. Turbine water-wheel tests and power tables, by R. E. Horton. 1906. 134 pp., 2 pls. 20c.

Scope indicated by title.

*185. Investigations on the purification of Boston sewage, * * * with a history of the sewage-disposal problem, by C.-E. A. Winslow and E. B. Phelps. 1906. 163 pp. 25c.

Discusses composition, disposal, purification, and treatment of sewages and tendencies in sewage-disposal practice in England, Germany, and the United States; describes character of crude sewage at Boston, removal of suspended matter, treatment in septic tanks, and purification in intermittent sand filtration and coarse material; gives bibliography.

*186. Stream pollution by acid-iron wastes, a report based on investigations made at Shelby, Ohio, by Herman Stabler. 1906. 36 pp., 1 pl.

Gives history of pollution by acid-iron wastes at Shelby, Ohio, and of resulting litigation; discusses effect of acid-iron liquors on sewage purification processes, recovery of copperas from acid-iron wastes, and other processes for removal of pickling liquor.

*187. Determination of stream flow during the frozen season, by H. K. Barrows and R. E. Horton. 1907. 93 pp., 1 pl. 15c.

Scope indicated by title.

*189. The prevention of stream pollution by strawboard waste, by E. B. Phelps. 1906. 29 pp., 2 pls.

Describes manufacture of strawboard, present and proposed methods of disposal of waste liquors, laboratory investigations of precipitation and sedimentation, and field studies of amounts and character of water used, raw material and finished product, and mechanical filtration.

*194. Pollution of Illinois and Mississippi rivers by Chicago sewage (a digest of the testimony taken in the case of the State of Missouri *v.* The State of Illinois and the Sanitary District of Chicago), by M. O. Leighton. 1907. 369 pp., 2 pls.

Scope indicated by amplification of title.

*200. Weir experiments, coefficients, and formulas (revision of paper No. 150), by R. E. Horton. 1907. 195 pp., 38 pls. 35c.

Scope indicated by title.

*226. The pollution of streams by sulphite-pulp waste, a study of possible remedies, by E. B. Phelps. 1909. 37 pp., 1 pl. 10c.

Describes manufacture of sulphite pulp, the waste liquors, and the experimental work leading to suggestions as to methods of preventing stream pollution.

*229. The disinfection of sewage and sewage filter effluents, with a chapter on the putrescibility and stability of sewage effluents, by E. B. Phelps. 1909. 91 pp., 1 pl. 15c.

Scope indicated by title.

*234. Papers on the conservation of water resources. 1909. 96 pp., 2 pls. 15c.

Contains the following papers, whose scope is indicated by their titles: Distribution of rainfall, by Henry Gannett; Floods, by M. O. Leighton; Developed water powers, compiled under the direction of W. M. Steuart, with discussion by M. O. Leighton; Undeveloped water powers, by M. O. Leighton; Irrigation, by F. H. Newell; Underground waters, by W. C. Mendenhall; Denudation, by R. B. Dole and Herman Stabler; Control of catchment areas, by H. N. Parker.

*235. The purification of some textile and other factory wastes, by Herman Stabler and G. H. Pratt. 1909. 76 pp. 10c.

Discusses waste waters from wool scouring, bleaching and dyeing cotton yarn, bleaching cotton piece goods, and manufacture of oleomargarine, fertilizer, and glue.

236. The quality of surface waters in the United States: Part I. Analyses of waters east of the one hundredth meridian, by R. B. Dole. 1909. 123 pp. 10c.

Describes collection of samples, methods of examination, preparation of solutions, accuracy of estimates, and expression of analytical results.

238. The public utility of water powers and their governmental regulation, by René Tavernier and M. O. Leighton. 1910. 161 pp. 15c.

Discusses hydraulic power and irrigation, French, Italian, and Swiss legislation relative to the development of water powers, and laws proposed in the French Parliament; reviews work of bureau of hydraulics and agricultural improvement of the French department of agriculture, and gives résumé of Federal and State water-power legislation in the United States.

*255. Underground waters for farm use, by M. L. Fuller. 1910. 58 pp., 17 pls. 15c.

Discusses rocks as sources of water supply and the relative safety of supplies from different materials; springs, and their protection; open or dug and deep wells, their location, yield, relative cost, protection, and safety; advantages and disadvantages of cisterns and combination wells and cisterns.

*257. Well-drilling methods, by Isaiah Bowman. 1911. 139 pp., 4 pls. 15c.

Discusses amount, distribution, and disposal of rainfall, water-bearing rocks, amount of ground water, artesian conditions, and oil and gas bearing formations; gives history of well drilling in Asia, Europe, and the United States; describes in detail the various methods and the machinery used; discusses loss of tools and geologic difficulties, contamination of well waters and methods of prevention, tests of capacity and measurement of depth, and costs of sinking wells.

*258. Underground water papers, 1910, by M. L. Fuller, F. G. Clapp, G. C. Matson, Samuel Sanford, and H. C. Wolff. 1911. 123 pp., 2 pls. 15c.

Contains the following papers (scope indicated by title) of general interest:
Drainage by wells, by M. L. Fuller.
Freezing of wells and related phenomena, by M. L. Fuller.
Pollution of underground waters in limestone, by G. C. Matson.
Protection of shallow wells in sandy deposits, by M. L. Fuller.
Magnetic wells, by M. L. Fuller.

*315. The purification of public water supplies, by G. A. Johnson. 1913. 84 pp., 8 pls. 10c.

Discusses ground, lake, and river waters as public supplies, development of waterworks systems in the United States, water consumption, and typhoid fever; describes methods of filtration and sterilization of water, and municipal water softening.

334. The Ohio Valley flood of March–April, 1913 (including comparisons with some earlier floods), by A. H. Horton and H. J. Jackson. 1913. 96 pp., 22 pls. 20c.

Although relating specifically to floods in the Ohio Valley, this report discusses also the causes of floods and the prevention of damage by floods.

337. The effects of ice on stream flow, by William Glenn Hoyt. 1913. 77 pp., 7 pls. 15c.

Discusses methods of measuring the winter flow of streams.

*345. Contributions to the hydrology of the United States, 1914; N. C. Grover, chief hydraulic engineer. 1915. 225 pp., 17 pls. 30c. Contains:

*(*e*) A method of determining the daily discharge of rivers of variable slope, by M. R. Hall, W. E. Hall, and C. H. Pierce, pp. 53–65. Scope indicated by title.

364. Water analyses from the laboratory of the United States Geological Survey, tabulated by F. W. Clarke, chief chemist. 1914. 40 pp. 5c.

Contains analyses of waters from rivers, lakes, wells, and springs in various parts of the United States, including analyses of the geyser water of Yellowstone National Park, hot springs in Montana, brines from Death Valley, water from the Gulf of Mexico, and mine waters from Tennessee, Michigan, Missouri and Oklahoma, Montana, Colorado and Utah, Nevada and Arizona, and California.

371. Equipment for current-meter gaging stations, by G. J. Lyon. 1915. 64 pp., 37 pls. 20c.

Describes methods of installing water-stage recorders and other gages and of constructing gage wells, shelters, structures for making discharge measurements, and artificial controls.

*375. Contributions to the hydrology of the United States, 1915; N. C. Grover, chief hydraulic engineer. 1916. 181 pp., 9 pls. 15c.

Contains three papers presented at the conference of engineers of the water-resources branch in December, 1914, as follows:

*(*a*) Relation of stream gaging to the science of hydraulics, by C. H. Pierce and R. W. Davenport, pp. 77–84.

(*e*) A method for correcting river discharge for a changing stage, by B. E. Jones, pp. 117–130.

(*f*) Conditions requiring the use of automatic gages in obtaining records of stream flow, by C. H. Pierce, pp. 131–139.

*400. Contributions to the hydrology of the United States, 1916; N. C. Grover, chief hydraulic engineer. 1917. 108 pp., 7 pls. Contains:

(*a*) The people's interest in water-power resources, by G. O. Smith, pp. 1–8.

*(*c*) The measurement of silt-laden streams, by R. C. Pierce, pp. 39–51.

(*d*) Accuracy of stream-flow data, by N. C. Grover and J. C. Hoyt, pp. 53–59.

416. The divining rod, a history of water witching, with a bibliography, by Arthur J. Ellis. 1917. 59 pp. 10c.

A brief paper published " merely to furnish a reply to the numerous inquiries that are continually being received from all parts of the country " as to the efficacy of the divining rod for locating underground water.

425. Contributions to the hydrology of the United States, 1917; N. C. Grover, chief hydraulic engineer. 1918. Contains:

*(*c*) Hydraulic conversion tables and convenient equivalents, pp. 71–94. 1917.

ANNUAL REPORTS.

*Fifth Annual Report of the United States Geological Survey, 1883–84, J. W. Powell, Director. 1885. xxxvi, 469 pp., 58 pls. $2.25. Contains:

*The requisite and qualifying conditions of artesian wells, by T. C. Chamberlin, pp. 125 to 173, pl. 21. Scope indicated by title.

Twelfth Annual Report of the United States Geological Survey, 1890–91, J. W. Powell, Director. 1891. 2 parts. Pt. II, Irrigation, xviii, 576 pp., 93 pls. $2. Contains:

*Irrigation in India, H. M. Wilson, pp. 363–561, pls. 107 to 146. See Water-Supply Paper 87.

Thirteenth Annual Report of the United States Geological Survey, 1891–92, J. W. Powell, Director. 1892. (Pts. II and III, 1893.) 3 parts. *Pt. III, Irrigation, xi, 486 pp., 77 pls. $1.85. Contains:

*American irrigation engineering, by H. M. Wilson, pp. 101–349, pls. 111–145. Discusses the economic aspects of irrigation, alkaline drainage, silt and sedimentation; gives brief history of legislation; describes perennial canals in Idaho-California, Wyoming, and Arizona; discusses water storage at reservoirs of the California and other projects, subsurface sources of supply, pumping, and subirrigation.

Fourteenth Annual Report of the United States Geological Survey, 1892–93, J. W. Powell, Director. 1893. (Pt. II, 1894.) 2 parts. *Pt. II, Accompanying papers, xx, 597 pp., 73 pls. $2.10. Contains:

*The potable waters of eastern United States, by W J McGee, pp. 1–47. Discusses cistern water, stream waters, and ground waters, including mineral springs and artesian wells.

*Natural mineral waters of the United States, by A. C. Peale, pp. 49–88, pls. 3 and 4. Discusses the origin and flow of mineral springs, the source of mineralization, thermal springs, the chemical composition and analysis of spring waters, geographic distribution, and the utilization of mineral waters; gives a list of American mineral spring resorts; contains also some analyses.

Nineteenth Annual Report of the United States Geological Survey, 1897–98, Charles D. Walcott, Director. 1898. (Parts II, III, and V, 1899.) 6 parts in 7 vols. and separate case for maps with Pt. V. *Pt. II, Papers chiefly of a theoretic nature, v, 958 pp., 172 pls. $2.65. Contains:

*Principles and conditions of the movements of ground water, by F. H. King, pp. 59–294, pls. 6–16. Discusses the amount of water stored in sandstone, in soil, and in other rocks, the depth to which ground water penetrates; gravitational, thermal, and capillary movements of ground waters, and the configuration of the ground-water surface; gives the results of experimental investigations on the flow of air and water through a rigid, porous medium, and through sands, sandstones, and silts; discusses results obtained by other investigators, and summarizes results of observations; discusses also rate of flow of water through sand and rock, the growth of rivers, rate of filtration through soil, interference of wells, etc.

*Theoretical investigation of the motion of ground waters, by C. S. Slichter, pp. 295–384, pl. 17. Scope indicated by title.

PROFESSIONAL PAPERS.

*72. Denudation and erosion in the southern Appalachian region and the Monongahela basin, by L. C. Glenn. 1911. 137 pp., 21 pls. 35c.

Describes the topography, geology, drainage, forests, climate, and population, and transportation facilities of the region, the relation of agriculture, lumbering, mining, and power development to erosion and denudation, and the nature, effects, and remedies of erosion; gives details of conditions in Holston, Nolichucky, French Broad, Little Tennessee, and Hiwassee river basins, along Tennessee River proper, and in the basins of the Coosa-Alabama system, Chattahoochee, Savannah, Saluda, Broad, Catawba, Yadkin, New, and Monongahela rivers.

86. The transportation of débris by running water, by G. K. Gilbert, based on experiments made with the assistance of E. C. Murphy. 1914. 263 pp., 3 pls. 70c.

The results of an investigation which was carried on in a specially equipped laboratory at Berkley, Cal., and was undertaken for the purpose of learning "the laws which control the movement of bed load and especially to determine how the quantity of load is related to the stream slope and discharge and to the degree of comminution of the débris."

A highly technical report.

105. Hydraulic-mining débris in the Sierra Nevada, by G. K. Gilbert. 154 pp., 34 pls. 1917. 50c.

Presents the results of an investigation undertaken by the United States Geological Survey in response to a memorial from the California Miners' Association asking that a particular study be made of portions of the Sacramento and San Joaquin valleys affected by detritus from torrential streams. The report deals largely with geologic and physiographic aspects of the subject, traces the physical effects, past and future, of the hydraulic mining of earlier decades, the similar effects which certain other industries induce through stimulation of the erosion of the soil, and the influence of the restriction of the area of inundation by the construction of levees. Suggests cooperation by several interests for the control of the streams now carrying heavy loads of débris.

BULLETINS.

*32. Lists and analyses of the mineral springs of the United States (a preliminary study), by A. C. Peale. 1886. 235 pp.

Defines mineral waters, lists the springs by States, and gives tables of analyses.

*319. Summary of the controlling factors of artesian flows, by M. L. Fuller. 1908. 44 pp., 7 pls. 10c.

Describes underground reservoirs, the sources of ground waters, the confining agents, the primary and modifying factors of artesian circulation, the essential and modifying factors of artesian flow, and typical artesian systems.

*479. The geochemical interpretation of water analyses, by Chase Palmer. 1911. 31 pp. 5c.

Discusses the expression of chemical analyses, the chemical character of water, and the properties of natural waters; gives a classification of waters based on property values and reacting values, and discusses the character of the waters of certain rivers as interpreted directly from the results of analyses; discusses also the relation of water properties to geologic formations, silica in river water, and the character of the waters of the Mississippi and the Great Lakes and St. Lawrence River as indicated by chemical analyses.

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[1] Many of the reports contain brief subject bibliographies. See abstracts.

[2] Many chemical analyses are scattered through the reports, as indicated by abstracts.

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SURFACE WATER SUPPLY OF THE UNITED STATES

1915

PART XI. PACIFIC SLOPE BASINS IN CALIFORNIA

NATHAN C. GROVER, Chief Hydraulic Engineer
H. D. McGLASHAN and F. F. HENSHAW, District Engineers

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SURFACE WATER SUPPLY OF PACIFIC SLOPE BASINS IN CALIFORNIA, 1915.

AUTHORIZATION AND SCOPE OF WORK.

This volume is one of a series of 14 reports presenting results of measurements of flow made on streams in the United States during the year ending September 30, 1915.

The data presented in these reports were collected by the United States Geological Survey under authority implied in the organic law (20 Stat. L., p. 394), which contains the following paragraph:

> *Provided*, That this officer [the Director] shall have the direction of the Geological Survey and the classification of public lands and examination of the geological structure, mineral resources, and products of the national domain.

The work was begun in 1888 in connection with special studies of water supply for irrigation. Since the fiscal year ending June 30, 1895, successive sundry civil bills passed by Congress have carried the following item and appropriations:

> For gaging the streams and determining the water supply of the United States, and for the investigation of underground currents and artesian wells, and for the preparation of reports upon the best methods of utilizing the water resources.

Annual appropriations for the fiscal years ending June 30, 1895–1915.

1895	$12,500
1896	20,000
1897 to 1900, inclusive	50,000
1901 to 1902, inclusive	100,000
1903 to 1906, inclusive	200,000
1907	150,000
1908 to 1910, inclusive	100,000
1911 to 1916, inclusive	150,000

In the execution of the work many private and State organizations have cooperated, either by furnishing data or by assisting in collecting data. Acknowledgments for coopertion of the first kind are made in connection with the description of each station affected; cooperation of the second kind is acknowledged on page 16.

Measurements of stream flow have been made at about 3,800 points in the United States and also at many points in small areas in Seward Peninsula and the Yukon-Tanana region, Alaska, and the Hawaiian Islands. In July, 1915, 1,350 gaging stations were being maintained by the Survey and the cooperating organizations. Many miscellaneous discharge measurements were made at other points. In connection with this work data were also collected in regard to precipitation, evaporation, storage reservoirs, river profiles, and water power in many sections of the country, and will be made available in water-supply papers from time to time. Information in regard to publications relating to water resource is presented in the appendix to this report.

DEFINITION OF TERMS.

The volume of water flowing in a stream—the "run-off" or "discharge"—is expressed in various terms, each of which has become associated with work of a certain class. These terms may be divided into two groups—(1) those that represent the rate of flow, as second-feet, gallons per minute, miner's inches, and discharge in second-feet per square mile, and (2) those that represent the actual quantity of water, as run-off in depth in inches, acre-feet, and millions of cubic feet. The principal terms used in this series of reports are second-feet, second-feet per square mile, run-off in inches, acre-feet, and millions of cubic feet. They may be defined as follows:

"Second-feet" is an abbreviation for "cubic feet per second." A second-foot is the rate of discharge of water flowing in a channel of rectangular cross section 1 foot wide and 1 foot deep at an average velocity of 1 foot per second. It is generally used as a fundamental unit from which others are computed by the use of the factors given in the tables of convenient equivalents (p. 11).

"Second-feet per square mile" is the average number of cubic feet of water flowing per second from each square mile of area drained, on the assumption that the run-off is distributed uniformly both as regards time and area.

"Run-off (depth in inches)" is the depth to which the drainage area would be covered if all the water flowing from it in a given period were conserved and uniformly distributed on the surface. It is used for comparing run-off with rainfall, which is usually expressed in depth of inches.

An "acre-foot" is equivalent to 43,560 cubic feet and is the quantity required to cover an acre to the depth of 1 foot. The term is commonly used in connection with storage.

"Millions of cubic feet" is used to express quantities of water stored in reservoirs, most frequently in connection with studies of flood control.

The following terms used in these reports are not in common use:

"Stage-discharge relation," an abbreviation for the term "relation of gage height to discharge."

"Control," "control section," and "point of control," terms used to designate the section or sections of the stream below the gage which determine the stage-discharge relation at the gage. It should be noted that the control may not be the same section or sections at all stages.

The "point of zero flow" for a given gaging station is that point on the gage—the gage height—to which the surface of the river would fall if there were no flow.

CONVENIENT EQUIVALENTS.

The following is a list of convenient equivalents for use in hydraulic computations:

Table for converting discharge in second-feet per square mile into run-off in depth in inches over the area.

Discharge in second-feet per square mile.	Run-off in inches.				
	1 day.	28 days.	29 days.	30 days.	31 days.
1	0.03719	1.041	1.079	1.116	1.153
2	.07438	2.083	2.157	2.231	2.306
3	.11157	3.124	3.236	3.347	3.459
4	.14876	4.165	4.314	4.463	4.612
5	.18595	5.207	5.393	5.578	5.764
6	.22314	6.248	6.471	6.694	6.917
7	.26033	7.289	7.550	7.810	8.070
8	.29752	8.331	8.628	8.926	9.223
9	.33471	9.372	9.707	10.041	10.376

NOTE.—For part of a month multiply the run-off for 1 day by the number of days.

Table for converting discharge in second-feet into run-off in acre-feet.

Discharge in second-feet.	Run-off in acre-feet.				
	1 day.	28 days.	29 days.	30 days.	31 days.
1	1.983	55.54	57.52	59.50	61.49
2	3.967	111.1	115.0	119.0	123.0
3	5.950	166.6	172.6	178.5	184.5
4	7.934	222.1	230.1	238.0	246.0
5	9.917	277.7	287.6	297.5	307.4
6	11.90	333.2	345.1	357.0	368.9
7	13.88	388.8	402.6	416.5	430.4
8	15.87	444.3	460.2	476.0	491.9
9	17.85	499.8	517.7	535.5	553.4

NOTE.—For part of a month multiply the run-off for 1 day by the number of days.

Table for converting discharge in second-feet into run-off in millions of cubic feet.

Discharge in second-feet.	Run-off in millions of cubic feet.				
	1 day.	28 days.	29 days.	30 days.	31 days.
1	0.0864	2.419	2.506	2.592	2.678
2	.1728	4.838	5.012	5.184	5.356
3	.2592	7.257	7.518	7.776	8.034
4	.3456	9.676	10.02	10.37	10.71
5	.4320	12.10	12.53	12.96	13.39
6	.5184	14.51	15.04	15.55	16.07
7	.6048	16.93	17.54	18.14	18.75
8	.6912	19.35	20.05	20.74	21.42
9	.7776	21.77	22.55	23.33	24.10

NOTE.—For part of a month multiply the run-off for 1 day by the number of days.

Table for converting discharge in second-feet into run-off in millions of gallons.

Discharge in second-feet.	Run-off in millions of gallons.				
	1 day.	28 days.	29 days.	30 days.	31 days.
1	0.6463	18.10	18.74	19.39	20.04
2	1.293	36.20	37.48	38.78	40.08
3	1.939	54.30	56.22	58.17	60.12
4	2.585	72.40	74.96	77.56	80.16
5	3.232	90.50	93.70	96.95	100.2
6	3.878	108.6	112.4	116.3	120.2
7	4.524	126.7	131.2	135.7	140.3
8	5.171	144.8	149.9	155.1	160.3
9	5.817	162.9	168.7	174.5	180.4

NOTE.—For part of a month multiply the run-off for 1 day by the number of days.

Table for converting velocity in feet per second into velocity in miles per hour.

[1 foot per second=0.681818 mile per hour, or two-thirds mile per hour, very nearly; 1 mile per hour=1.4666 feet per second. In computing the table the figures 0.68182 and 1.4667 were used.]

Feet per second (units).	Miles per hour for tenths of foot per second.									
	0	1	2	3	4	5	6	7	8	9
0	0.000	0.068	0.136	0.205	0.273	0.341	0.409	0.477	0.545	0.614
1	.682	.750	.818	.886	.995	1.02	1.09	1.16	1.23	1.30
2	1.36	1.43	1.50	1.57	1.64	1.70	1.77	1.84	1.91	1.98
3	2.05	2.11	2.18	2.25	2.32	2.39	2.45	2.52	2.59	2.66
4	2.73	2.80	2.86	2.93	3.00	3.07	3.14	3.20	3.27	3.34
5	3.41	3.48	3.55	3.61	3.68	3.75	3.82	3.89	3.95	4.02
6	4.09	4.16	4.23	4.30	4.36	4.43	4.50	4.57	4.64	4.70
7	4.77	4.84	4.91	4.98	5.05	5.11	5.18	5.25	5.32	5.39
8	5.45	5.52	5.59	5.66	5.73	5.80	5.86	5.93	6.00	6.07
9	6.14	6.20	6.27	6.34	6.41	6.48	6.55	6.61	6.68	6.75

Table for converting discharge in second-feet into theoretical horsepower per foot of fall.

[1 second-foot=0.1136 theoretical horsepower per foot of fall. Weight of 1 cubic foot of water=62.5 pounds.]

Tens.	Units.									
	0	1	2	3	4	5	6	7	8	9
0	0.00	0.114	0.227	0.341	0.454	0.568	0.682	0.795	0.909	1.02
1	1.14	1.25	1.36	1.48	1.59	1.70	1.82	1.93	2.04	2.16
2	2.27	2.39	2.50	2.61	2.73	2.84	2.95	3.07	3.18	3.29
3	3.41	3.52	3.64	3.75	3.86	3.98	4.09	4.20	4.32	4.43
4	4.54	4.66	4.77	4.88	5.00	5.11	5.23	5.34	5.45	5.57
5	5.68	5.79	5.91	6.02	6.13	6.25	6.36	6.48	6.59	6.70
6	6.82	6.93	7.04	7.16	7.27	7.38	7.50	7.61	7.72	7.84
7	7.95	8.07	8.18	8.29	8.41	8.52	8.63	8.75	8.86	8.97
8	9.09	9.20	9.32	9.43	9.54	9.66	9.77	9.88	10.0	10.1
9	10.2	10.3	10.5	10.6	10.7	10.8	10.9	11.0	11.1	11.2

1 second-foot equals 40 California miner's inches (law of Mar. 23, 1901).

1 second-foot equals 38.4 Colorado miner's inches.

1 second-foot equals 40 Arizona miner's inches.

1 second-foot equals 7.48 United States gallons per second; equals 448.8 gallons per minute; equals 646,317 gallons for one day.

1 second-foot for one year (365 days) covers 1 square mile13.574 inches, or 1.131 feet deep.

1 second-foot for one year (365 days) equals 31,536,000 cubic feet.

1 second-foot equals about 1 acre-inch per hour.

1 second-foot for one year (365 days) equals 724 acre-feet.
1 second-foot for one day equals 86,400 cubic feet.
1,000,000,000 (1 United States billion) cubic feet equals 11,570 second-feet for one day.
1,000,000,000 cubic feet equals 414 second-feet for one 28-day month.
1,000,000,000 cubic feet equals 399 second-feet for one 29-day month.
1,000,000,000 cubic feet equals 386 second-feet for one 30-day month.
1,000,000,000 cubic feet equals 373 second-feet for one 31-day month.
100 California miner's inches equals 18.7 United States gallons per second.
100 California miner's inches for one day equals 4.96 acre-feet.
100 Colorado miner's inches equals 2.60 second-feet.
100 Colorado miner's inches equals 19.5 United States gallons per second.
100 Colorado miner's inches for one day equals 5.17 acre-feet.
100 United States gallons per minute equals 0.223 second-foot.
100 United States gallons per minute for one day equals 0.442 acre-foot.
1,000,000 United States gallons per day equals 1.55 second-feet.
1,000,000 United States gallons equals 3.07 acre-feet.
1,000,000 cubic feet equals 22.95 acre-feet.
1 acre-foot equals 325,850 gallons.
1 inch deep on 1 square mile equals 2,323,200 cubic feet.
1 inch deep on 1 square mile equals 0.0737 second-foot per year.
1 foot equals 0.3048 meter.
1 mile equals 1.60935 kilometers.
1 mile equals 5,280 feet.
1 acre equals 0.4047 hectare.
1 acre equals 43,560 square feet.
1 acre equals 209 feet square, nearly.
1 square mile equals 2.59 square kilometers.
1 cubic foot equals 0.0283 cubic meter.
1 cubic foot of water weighs 62.5 pounds.
1 cubic meter per minute equals 0.5886 second-foot.
1 horsepower equals 550 foot-pounds per second.
1 horsepower equals 76 kilogram-meters per second.
1 horsepower equals 746 watts.
1 horsepower equals 1 second-foot falling 8.80 feet.
1⅓ horsepower equals about 1 kilowatt.

To calculate water power quickly: $\frac{\text{Second-feet} \times \text{fall in feet}}{11}$ = net horsepower on water wheel realizing 80 per cent of theoretical power.

EXPLANATION OF DATA.

The data presented in this report cover the year beginning October 1, 1914, and ending September 30, 1915. At the first of January in most parts of the country a large amount of the precipitation for the preceding three months is stored either as ground water, in the form of snow, or in lakes. This stored water passes off in the streams during the spring break-up. At the end of September the only stored water available for run-off in the streams is possibly a small amount held in ground storage. Therefore the run-off for a year beginning with October 1 is practically all derived from precipitation occurring within that year.

The base data collected at gaging stations (Pl. I, *B*) consist of records of stage, measurements of discharge, and general information used to supplement the gage heights and discharge measurements in determining the daily flow. The records of stage are obtained either from direct readings on a staff gage or from a water-stage recorder (Pl. II) that gives a continuous record of the fluctuations. Measurements of discharge are made with a current meter or by the general methods outlined in standard textbooks on the measurement of river discharge.

From the discharge measurements rating tables are prepared that give the discharge for any stage, and these rating tables, when applied to the gage heights give the daily discharge from which the monthly and yearly mean discharge is determined.

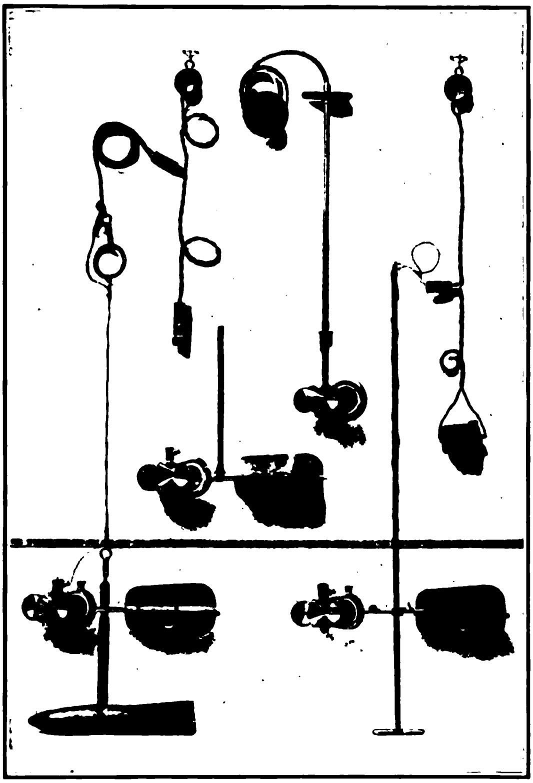
The data presented for each regular gaging station comprise a description of the station, a table giving results of discharge measurements, a table showing the daily discharge of the stream, and a table of monthly and yearly discharge and run-off.

If the base data are insufficient to determine the daily discharge, tables giving daily gage heights and results of discharge measurements are published.

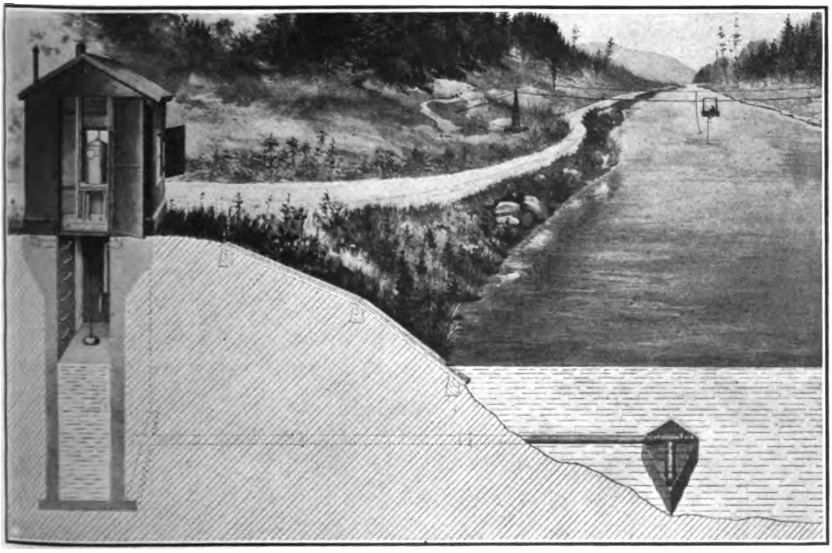
The description of the station gives, in addition to statements regarding the location and equipment, information in regard to any conditions that may affect the constancy of the stage-discharge relation, covering such subjects as the occurrence of ice, the use of the stream for log driving, shifting of channel, and the cause and effect of backwater; it gives also information as to diversions that decrease the flow at the gage, artificial regulation, maximum and minimum recorded stages, and the accuracy of the results.

The table of daily discharge gives the discharge in second-feet corresponding to the mean of the gage heights read each day. At stations subject to sudden or rapid diurnal fluctuation the discharge obtained from the rating table and the mean daily gage height may not be the true mean discharge for the day. If such stations are equipped with water-stage recorders, the mean daily discharge may be obtained by computing the mean daily gage height and applying it to the rating table, by averaging discharge at regular intervals during the day, or by use of the discharge integrator—an instrument operating on the principle of the planimeter and containing as an essential element the rating curve of the station.

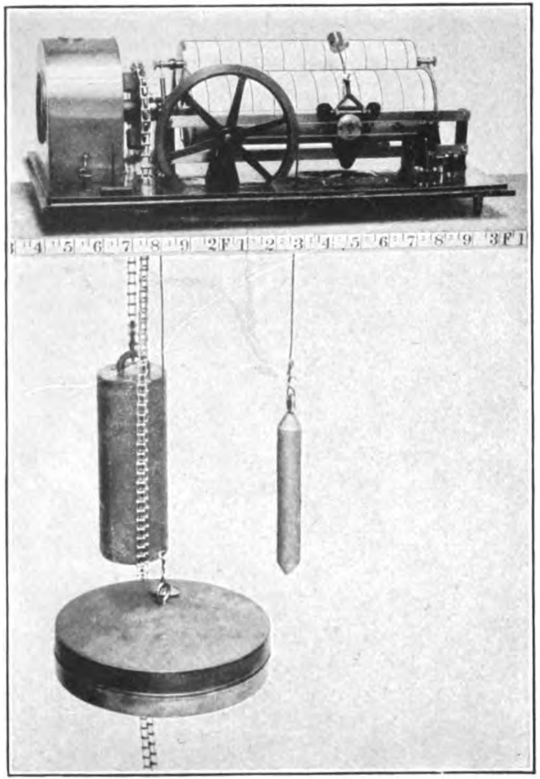
In the table of monthly discharge the column headed "Maximum" gives the mean flow for the day when the mean gage height was highest. As the gage height is the mean for the day, it does not indicate correctly the stage when the water surface was at crest height and the corresponding discharge was consequently larger than given in the maximum column. Likewise, in the column of "Mini-



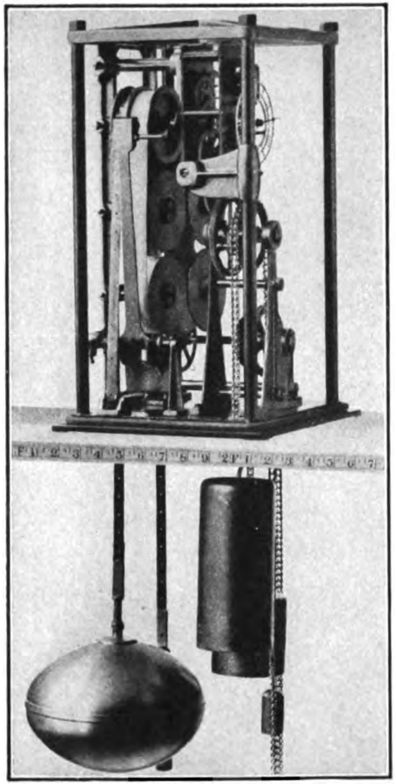
A. PRICE CURRENT METERS.



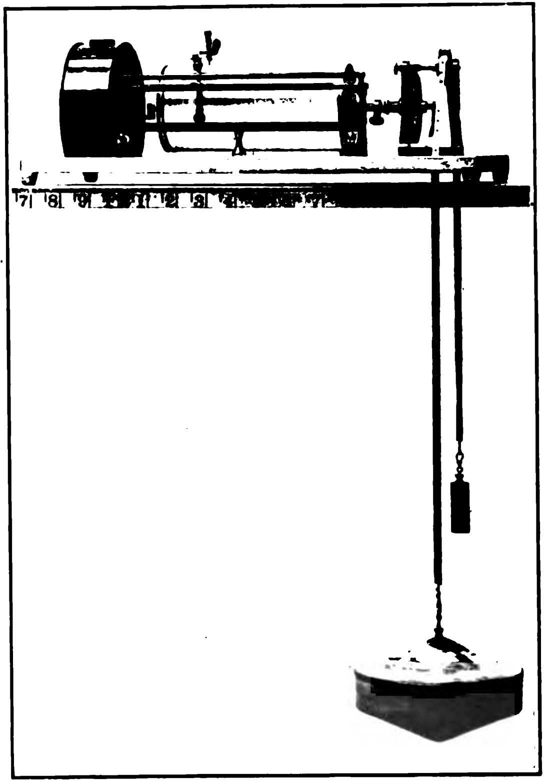
B. TYPICAL GAGING STATION.



A. STEVENS.



B. GURLEY PRINTING.



C. FRIEZ.

WATER-STAGE RECORDERS.

mum" the quantity given is the mean flow for the day when the mean gage height was lowest. The column headed "Mean" is the average flow in cubic feet for each second during the month. On this average flow the computations recorded in the remaining columns, which are defined on pages 10 and 11, are based.

ACCURACY OF FIELD DATA AND COMPUTED RESULTS.

The accuracy of stream-flow data depends primarily (1) on the permanence of the stage-discharge relation and (2) on the accuracy of observation of stage, measurements of flow, and interpretation of records.

Footnotes added to the daily-discharge tables give information regarding the probable accuracy of the rating tables used, and an accuracy column is inserted in the monthly discharge table. For the rating tables, "well-defined" indicates, in general, that the rating is probably accurate within 5 per cent; "fairly well defined," within 10 per cent; "poorly defined" or "approximate" within 15 to 25 per cent. These notes are very general and are based on the plotting of the individual measurements with reference to the mean rating curve.

The letter in the column headed "Accuracy," in the monthly discharge table rates the accuracy of the monthly mean and not that of the estimate of maximum or minimum discharge or the discharge for any one day. The rating is determined by considering the accuracy of the rating curve, the probable reliability of the observer, the number of gage readings per day, the range of the fluctuation in stage, and local conditions. In this column A indicates that the mean monthly flow is probably accurate within 5 per cent; B, within 10 per cent; C, within 15 per cent; D, within 25 per cent. Special conditions are covered by footnotes.

The monthly means for any station may represent with high accuracy the quantity of water flowing past the gage, but the figures showing discharge per square mile and depth of run-off in inches may be subject to gross errors caused by the inclusion of large noncontributing districts in the measured drainage area, by lack of information concerning water diverted for irrigation or other use, or by inability to interpret the effect of artificial regulation of the flow of the river above the station. "Second-feet per square mile" and "run-off (depth in inches)" are therefore not computed if such errors appear probable. The computations are also omitted for streams draining areas in which the annual rainfall is less than 20 inches. All figures representing "second-feet per square mile" and "run-off (depth in inches)" previously published by the Survey should be used with caution because of possible inherent sources of error not known to the Survey.

The table of monthly discharge gives only a general idea of the flow at the station and should not be used for other than preliminary estimates; the tables of daily discharge allow more detailed studies of the variation in flow. It should be borne in mind, however, that the observations in each succeeding year may be expected to throw new light on data already collected and published.

COOPERATION.

Acts of the State legislature, approved March 16, 1903, March 20, 1905, March 11, 1907, and April 22, 1909, empower the State authorities of California to enter into contracts with the Director of the United States Geological Survey for the purpose of making topographic maps, gaging streams, surveying reservoir sites and canal locations for the conservation and utilization of the flood and storm waters of the State. The work for the year ending September 30, 1915, was maintained in accordance with the contract approved by the State board of control and signed by W. F. McClure, State engineer. Additional funds were furnished by the State Conservation Commission, of which George C. Pardee is chairman and Francis Cuttle and J. P. Baumgartner are members.

Assistance in the maintenance of gaging stations was furnished by the United States Forest Service, United States Weather Bureau, United States Indian Office, United States Bureau of Fisheries, Yosemite National Park, Sequoia National Park, City of San Francisco, Santa Barbara Water Commission, Volcan Land & Water Co., Cuyamaca Water Co., Sweetwater Water Co., La Mesa Mutual Water Co., Southern California Edison Co., the Turlock, Modesto, Oakdale, and South San Joaquin irrigation districts, Yosemite Power Co., Utica Gold Mining Co., Sierra & San Francisco Power Co., Pacific Gas & Electric Co., Oro Electric Co., Yolo Water & Power Co., C. H. Lee, J. T. Mason, H. O. Wickes, and W. H. Hotelling.

Many private records of stream flow have been furnished for publication. Acknowledgment for this cooperation is made in the descriptive matter preceding the data.

The work in Oregon was carried on under a cooperative agreement with the State through John H. Lewis, State engineer. Financial cooperation was also furnished by the United States Indian Office, Goose Lake Valley Irrigation Co., and Rogue River Valley Canal Co.

DIVISION OF WORK.

The data for stations in California were collected and prepared for publication under the direction of H. D. McGlashan, district engineer, by F. C. Ebert, Lasley Lee, Charles Leidl, R. C. Rice, W. V. Hardy, C. J. Emerson, C. P. Firestone, H. J. Tompkins, J. H. Morgan, J. F. Kunesh, and M. B. Trelease.

Data for stations in Oregon were collected and prepared for publication under the direction of F. F. Henshaw, district engineer, by C. L. Batchelder, P. V. Hodges, R. C. Briggs, J. J. Hubbell, and Norris Bostwick.

The manuscript was assembled by B. J. Peterson.

GAGING-STATION RECORDS.

TIA JUANA RIVER BASIN.

TIA JUANA RIVER NEAR NESTOR, CAL.

Location.—At highway bridge on line between secs. 3 and 4, T. 19 S., R. 2 W., 1¾ miles south of Nestor, San Diego County, and 3 miles above mouth of river.

Drainage area.—Not measured.

Records available.—January 29 to September 30, 1915, when station was discontinued.

Gage.—Stage determined twice a day by measuring from top of bedplate of east truss of bridge to the water surface; readings reduced to elevations above sea level, United States Geological Survey datum. Observer, John McCan.

Discharge measurements.—Made from bridge or by wading.

Channel and control.—Sand; shifting.

Diversions.—Dulzura conduit diverts from Cottonwood Creek about 12½ miles above its junction with Tia Juana River; no other large diversions above station. Water for irrigation is pumped from wells in valley above station.

Regulation.—Morena reservoir, capacity 46,000 acre-feet, is on Cottonwood Creek about 19 miles above its mouth.

Accuracy.—Results reported as good.

Cooperation.—Complete record furnished by C. H. Lee, consulting engineer.

Discharge measurements of Tia Juana River near Nestor, Cal., during the year ending Sept. 30, 1915.

Date.	Made by—	Gage height.	Discharge.	Date.	Made by—	Gage height.	Discharge.
		Feet.	*Sec.-ft.*			*Feet.*	*Sec.-ft.*
Jan. 29[a]	K. B. Sleppy	23.30	524	Mar. 3[a]	D. L. Lee	23.70	1,400
Feb. 5[a]	D. L. Lee	22.80	548	27	K. B. Sleppy	22.41	62.0
9[a]	K. B. Sleppy	22.17	84.0	Apr. 6	.....do	22.34	47.0
11[b]	D. L. Lee	25.60	2,700	10	D. L. Lee	22.28	31.7
14[a]	.....do	23.05	880	May 1	.....do	23.02	170
23[a]	.....do	23.06	506	June 7	.....do	21.86	1.0

[a] Made from bridge; angle of current, 30°; correction coefficient applied, 0.866 and flow in north channel added.

[b] Float measurement.

Daily discharge, in second-feet, of Tia Juana River near Nestor, Cal., for the year ending Sept. 30, 1915.

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	Day.	Jan.	Feb.	Mar.	Apr.	May.	June.
1	....	202	893	48	201	18	16	....	918	381	29	185	....
2	....	620	2,361	48	638	18	17	....	655	332	31	114	....
3	....	1,800	1,909	40	852	14	18	....	627	283	18	102	....
4	....	1,245	1,539	40	934	14	19	....	488	217	13	201	....
5	....	770	1,506	39	1,157	10	20	....	455	160	11	160	....
6	....	306	1,324	39	1,414	2	21	....	1,147	154	9	108	....
7	....	233	1,175	39	1,216	2	22	....	975	119	10	72	....
8	....	131	1,026	32	975	....	23	....	728	92	21	61	....
9	....	95	952	26	957	....	24	....	567	92	23	45	....
10	....	168	1,026	30	834	....	25	....	713	72	28	61	....
11	....	3,061	1,059	25	424	....	26	....	877	58	25	39	....
12	....	1,921	909	25	363	....	27	....	770	58	15	31	....
13	....	1,608	860	24	242	....	28	....	729	58	10	25	....
14	....	1,313	721	23	340	....	29	530	....	58	12	23	....
15	....	1,032	613	22	267	....	30	2,743	....	58	27	23	....
							31	806	....	50	....	18	....

NOTE.—No flow Oct. 1 to Jan. 28 and June 8 to Sept. 30.

Monthly discharge of Tia Juana River near Nestor, Cal., for the year ending Sept. 30, 1915.

Month.	Discharge in second-feet.			Run-off (total in acre-feet).
	Maximum.	Minimum.	Mean.	
October	0	0	0	0
November	0	0	0	0
December	0	0	0	0
January	2,743	0	132	8,076
February	3,061	95	863	47,825
March	2,361	50	649	39,828
April	48	10	26	1,548
May	1,414	18	390	23,922
June	18	0	2.6	154
July	0	0	0	0
August	0	0	0	0
September	0	0	0	0
The year	3,061	0	168	121,353

COTTONWOOD CREEK NEAR DULZURA, CAL.

LOCATION.—In the SW. ¼ sec. 15, T. 17 S., R. 3 E., at Barrett dam, 1½ miles below intake of Dulzura conduit, and about 17 miles northeast of Dulzura, San Diego County. Lyons Creek enters half a mile and Pine Valley Creek a mile above the station.

DRAINAGE AREA.—246 square miles (measured on topographic maps).

RECORDS AVAILABLE.—January 1, 1906, to September 30, 1915.

GAGE.—Two vertical staff gages have been in use since 1909; readings on upper staff, which is fastened to upstream face of dam on left bank, show depth of water over crest; lower staff is fastened to upstream face of dam between flume and right bank and is read when no water flows over crest of dam; datum of lower gage is 2.50 feet below that of upper gage. Previous to 1909 several gages at independent datums were used.

DISCHARGE MEASUREMENTS.—Made by wading at low concrete dam, back of which sand and gravel have been deposited to the level of its crest. At low stages the flow is restricted to a rectangular wooden flume through the wall of the dam, but at high stages the flow is over the entire length of the crest, which is 61 feet. At high stages only float measurements have been made.

CHANNEL AND CONTROL.—Above and below dam channel is principally sand and is shifting. Dam acts as an artificial control for the station.

EXTREMES OF DISCHARGE.—1906–1915: Maximum mean daily discharge, 5,800 second-feet March 24, 1906; minimum, no flow for several months every year since completion of Dulzura conduit in January, 1909.

DIVERSIONS.—Dulzura conduit diverts water from Cottonwood and Pine Valley creeks, about half a mile above their junction, into Dulzura Creek drainage basin. See record Dulzura conduit near Dulzura, Cal. (pp. 21–22).

REGULATION.—Morena reservoir on Cottonwood Creek, about 8 miles above Barrett dam, has a capacity of 46,000 acre-feet. Water stored in this reservoir is released when needed for Dulzura conduit. September 30, 1915, reservoir gage read 118.6 feet, showing 15,900 acre-feet of storage.

COOPERATION.—Record showing gallons per day furnished by the city of San Diego through George Cromwell, city engineer. Daily discharge converted into second-feet and monthly discharge computed by United States Geological Survey.

Discharge measurements of Cottonwood Creek near Dulzura, Cal., during the year ending Sept. 30, 1915.

[Made by F. C. Ebert.]

Date.	Gage height.	Discharge.
	Feet.	*Sec.-ft.*
Apr. 5	0.30	4.0
Sept. 23	.30	1.0

Daily discharge, in second-feet, of Cottonwood Creek near Dulzura, Cal., for the year ending Sept. 30, 1915.

Day.	Dec.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.
1	....	0.70	12.2	82	5.3	76	4.9	2.6	2.5	3.7
2	0.35	.70	74	115	5.0	95	6.6	2.5	2.4	3.7
3	.35	.70	100	82	4.6	96	4.7	2.5	2.2	3.7
4	.35	.70	29	78	4.3	104	4.1	2.5	2.3	3.7
5	.35	.70	9.4	75	4.4	257	3.8	2.5	2.2	3.7
6	.35	.70	3.7	65	5.4	176	3.6	2.3	2.0	3.7
7	.35	.70	2.0	62	5.0	130	3.5	2.2	2.0	3.7
8	.35	.70	1.2	46	4.9	118	3.4	2.2	1.9	3.7
9	.35	.70	.43	33	4.6	102	3.3	2.2	1.9	3.7
10	.35	.70	81	31	4.4	95	3.3	2.3	1.8	3.7
11	.35	.70	448	30	4.3	80	3.3	2.3	1.7	3.7
12	1.2	.70	190	19.6	4.3	67	3.3	2.2	1.6	3.7
13	.70	.70	112	13.8	7.0	64	3.2	2.2	1.9	3.7
14	.56	.70	83	10.9	9.8	42	3.2	2.1	3.7	3.7
15	.56	.70	65	8.9	5.7	35	3.0	2.1	3.7	3.7
16	.56	.70	42	7.8	6.2	28	2.9	2.2	3.7	3.7
17	1.30	.70	43	6.7	5.3	25	2.9	2.1	3.7	3.7
18	1.70	.70	20	5.1	5.4	45	3.0	2.1	3.7	3.7
19	1.30	.70	18.2	5.3	4.7	33	2.8	2.1	3.7	3.6
20	1.30	.70	43	4.6	4.6	22	2.9	1.9	3.7	3.4
21	.70	.70	60	4.8	5.1	14.7	2.8	1.9	3.7	3.3
22	.70	1.3	68	4.1	11.2	10.5	2.8	2.0	3.7	2.8
23	.70	.70	44	3.1	8.6	27	2.8	2.0	3.7	2.7
24	.70	.70	22	2.9	9.9	22	2.8	2.0	3.7	3.0
25	.70	.70	32	2.9	4.9	7.1	2.8	2.5	3.7	3.6
26	.70	.70	23	2.9	5.4	5.9	2.8	2.5	3.7	4.4
27	.70	.70	14.3	3.3	5.1	5.1	2.8	2.5	3.7	4.4
28	.70	1.0	10.2	3.2	5.4	4.8	2.6	2.4	3.7	4.2
29	.70	169	....	3.4	7.5	4.7	2.5	2.5	3.7	4.0
30	.70	141	....	4.4	65	4.5	2.6	2.7	3.7	3.9
31	.70	39	....	5.4	....	4.3	....	2.7	3.7	....

NOTE.—No flow Oct. 1 to Dec. 1.

Monthly discharge of Cottonwood Creek near Dulzura, Cal., for the year ending Sept. 30, 1915.

Month.	Discharge in second-feet.			Run-off (total in acre-feet).
	Maximum.	Minimum.	Mean.	
October	0.0	0.0	0.0	0
November	.0	.0	.0	0
December	1.7	.0	.657	40
January	169	.70	11.9	732
February	448	.43	59.0	3,280
March	115	2.9	26.5	1,630
April	65	4.3	7.78	463
May	257	4.3	58.1	3,570
June	6.6	2.5	3.30	196
July	2.7	1.9	2.28	140
August	3.7	1.6	3.00	184
September	4.4	2.7	3.66	218
The year	448	.0	14.4	10,500

NOTE.—Monthly and yearly discharge computed by engineers of the U. S. Geological Survey.

Combined daily discharge, in second-feet, of Cottonwood Creek and Dulzura conduit near Dulzura, Cal., for the year ending Sept. 30, 1915.

Day.	Dec.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.
1	0.00	1.7	57	131	33	128	42	15.5	6.1	3.7
2	.35	1.2	120	160	32	147	43	14.7	6.0	3.7
3	.35	1.6	144	130	32	148	41	14.4	4.5	3.7
4	.35	.7	72	127	30	155	41	14.4	4.0	3.7
5	.35	1.9	52	121	29	310	39	13.8	3.6	3.7
6	.35	2.3	46	111	33	227	38	13.3	3.2	3.7
7	.35	2.8	34	113	32	180	34	12.9	2.0	3.7
8	.35	3.4	31	95	30	166	32	12.9	1.9	3.7
9	.35	3.0	26	84	29	147	30	11.4	1.9	3.7
10	.35	3.5	127	82	26	131	28	11.5	1.8	3.7
11	.35	3.1	462	79	25	120	28	11.5	1.7	3.7
12	1.2	3.1	194	71	24	111	27	10.7	1.6	3.7
13	.7	3.1	136	65	21	98	26	10.0	1.9	3.7
14	.56	3.1	127	62	27	85	26	10.3	3.7	3.7
15	.56	3.4	108	58	38	86	25	9.2	3.7	3.7
16	.56	3.4	84	55	34	75	23	9.4	3.7	3.7
17	1.3	3.1	83	53	27	75	22	9.4	3.7	3.7
18	1.7	2.8	66	50	25	96	21	8.8	3.7	3.7
19	6.6	2.8	61	49	25	82	21	8.6	3.7	3.6
20	6.6	2.0	88	47	23	71	20	7.8	3.7	3.4
21	4.9	2.8	104	45	25	65	19.9	7.4	3.7	3.3
22	3.5	12.6	92	43	52	60	19.9	7.5	3.7	2.8
23	2.8	7.2	71	43	54	61	19.9	7.0	3.7	2.7
24	2.5	7.1	66	40	51	44	19.6	6.5	3.7	3.0
25	1.9	6.6	79	39	48	55	18.6	6.7	3.7	3.6
26	1.2	6.3	70	38	40	54	18.2	6.4	3.7	4.4
27	1.6	5.7	62	43	37	50	17.6	6.1	3.7	4.4
28	2.1	7.9	55	41	34	47	16.7	5.8	3.7	4.2
29	2.0	191	....	43	46	47	16.0	5.9	3.7	4.0
30	1.9	193	....	38	116	44	15.8	6.1	3.7	3.9
31	1.9	87	....	35	....	42	....	6.2	3.7	....

Combined monthly discharge of Cottonwood Creek and Dulzura conduit near Dulzura, Cal., for the year ending Sept. 30, 1915.

Month.	Discharge in second-feet.			Run-off (total in acre-feet).
	Maximum.	Minimum.	Mean.	
October	0.0	0.0	0.0	0
November	.0	.0	.0	0
December	6.6	.0	1.60	98
January	193	.7	18.7	1,150
February	462	26	97.0	5,390
March	160	35	70.7	4,350
April	116	21	35.9	2,140
May	310	42	103	6,330
June	43	15.8	26.3	1,560
July	15.5	5.8	9.75	600
August	6.1	1.6	3.45	212
September	4.4	2.7	3.66	218
The year	462	.0	30.5	22,000

DULZURA CONDUIT NEAR DULZURA, CAL.

Location.—Two miles southeast of Dulzura, San Diego County, and 12 miles below intake from Cottonwood Creek. During 1909 and 1910 station was 1½ miles below intake.

Records available.—January 1, 1909, to September 30, 1915.

Gage.—Lietz water-stage recorder at weir.

Discharge.—Computed from gage-height record at an 8-foot steel plate weir about 1½ miles above lower end of conduit.

Extremes of discharge.—Maximum discharge reported, 65.1 second-feet February 4, 1911. No flow in conduit for certain periods each year.

Accuracy.—Water-stage recorder is checked twice every day by patrolman. Loss by seepage between intake and measuring weir estimated at 3 per cent.

Cooperation.—Record in gallons per day furnished by the city of San Diego through George Cromwell, city engineer. Daily discharge converted into second-feet and monthly discharge computed by United States Geological Survey.

Dulzura conduit diverts water from Cottonwood and Pine Valley creeks about half a mile above their junction. The conduit is 13.38 miles long and is lined with concrete except 4,490 feet of flume and 9,219 feet of tunnel. The average width is about 5 feet and the depth 4 feet 2 inches. The grade is 4 feet in 5,000 and the capacity 40,000,000 gallons per day (62 second-feet). The water, which is stored at Morena reservoir, flows down the natural channel of Cottonwood Creek about 6½ miles to the intake of the conduit. The flow of Pine Valley and Lyons Valley creeks is also diverted into the conduit. From the conduit the water flows down the natural channel of Dulzura Creek into Lower Otay reservoir, where it is diverted for municipal use at San Diego.

Daily discharge, in second-feet, of Dulzura conduit near Dulzura, Cal., for the year ending Sept. 30, 1915.

Day.	Dec.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.
1	....	1.0	45	49	28	52	37	12.9	3.6
2	....	.46	46	45	27	52	36	12.2	3.6
3	....	.93	44	48	27	52	36	11.9	2.3
4	....	.00	43	49	26	51	37	11.9	1.7
5	....	1.2	43	46	25	53	35	11.3	1.4
6	....	1.6	42	46	28	51	34	11.0	1.2
7	....	2.1	32	51	27	50	31	10.7	....
8	....	2.7	30	49	25	48	29	10.7	....
9	....	2.3	26	51	24	45	27	9.2	....
10	....	2.8	46	51	22	36	25	9.2	....
11	....	2.4	13.8	49	21	40	25	9.2	....
12	....	2.4	4.2	51	20	44	24	8.5	....
13	....	2.4	24	51	14.4	34	23	7.8	....
14	....	2.4	44	51	17.1	43	23	8.2	....
15	....	2.7	43	49	32	51	22	7.1	....
16	....	2.7	42	47	28	47	20	7.2	....
17	....	2.4	40	46	22	50	19.2	7.3	....
18	....	2.1	46	45	20	51	18.4	6.7	....
19	5.3	2.1	43	44	20	49	17.8	6.5	....
20	5.3	1.3	45	42	18.8	49	17.1	5.9	....
21	4.2	2.1	44	40	20	50	17.1	5.5	....
22	2.8	11.3	24	39	41	49	17.1	5.5	....
23	2.1	6.5	27	40	45	34	17.1	5.0	....
24	1.8	6.4	44	37	41	22	16.8	4.5	....
25	1.2	5.9	47	36	43	48	15.8	4.2	....
26	.46	5.6	47	35	35	48	15.4	3.9	....
27	.93	5.0	48	40	32	45	14.8	3.6	....
28	1.4	6.9	45	38	29	42	14.1	3.4	....
29	1.3	22	....	40	39	42	13.5	3.4	....
30	1.2	52	....	34	51	40	13.2	3.4	....
31	1.2	48	....	30	....	38	....	3.5	....

NOTE.—No flow Oct. 1 to Dec. 18 and Aug. 7 to Sept. 30.

Monthly discharge of Dulzura conduit near Dulzura, Cal., for the year ending Sept. 30, 1915.

Month.	Discharge in second-feet.			Run-off (total in acre-feet).
	Maximum.	Minimum.	Mean.	
October	0.0	0.0	0.0	0
November	.0	.0	.0	0
December	5.3	.0	.942	58
January	52	.0	6.76	416
February	48	4.2	38.1	2,120
March	51	30	44.2	2,720
April	51	14.4	28.3	1,680
May	53	22	45.4	2,790
June	37	13.2	23.0	1,370
July	12.9	3.4	7.46	459
August	3.6	.0	.45	28
September	.0	.0	.0	0
The year	53	.0	16.1	11,600

NOTE.—Monthly and yearly discharge computed by engineers of the United States Geological Survey.

SWEETWATER RIVER BASIN.

SWEETWATER RIVER NEAR DESCANSO, CAL.

Location.—In the SE. ¼ sec. 25, T. 15 S., R. 3 E., San Diego County, at Ellis ranch, 1½ miles below Descanso and 2 miles below mouth of Guatay Creek.

Drainage area.—43.7 square miles (measured on topographic maps).

Records available.—November 21, 1905, to September 30, 1915.

Gage.—Staff gage in three sections, on left bank at concrete control, a short distance below intake of Ellis ditch; read twice a day by C. H. Ellis. Previous gage was at same datum and practically same location.

Discharge measurements.—Made from cable at gage or by wading.

Channel and control.—Channel composed of sand and fine gravel; shifting. Banks high in most places and not likely to be overflowed. On October 11, 1914, a concrete control was constructed across the channel opposite the original gage. Point of zero flow, gage height 0.5 foot.

Extremes of discharge.—Maximum stage recorded during year, 5.5 feet during night of February 10 (discharge, about 1,750 second-feet, determined from extension of rating curve); minimum stage, October 1 to 5 (estimated discharge, 0.1 second-foot).

1905–1915: Maximum stage recorded, 9.25 feet at 5 p. m. March 24, 1906 (discharge, about 3,000 second-feet, determined from extension of rating curve). No flow during parts of 1910, 1911, and 1913.

Diversions.—About 0.3 second-foot is diverted above gage for irrigation on Ellis ranch.

Regulation.—None.

Accuracy.—Results good except for low-water period, June to September., During this period sand collected in front of the control and caused slight changes in the stage-discharge relation. Rating curve used October 11 to May 24 well defined below 100 second-feet.

Discharge measurements of Sweetwater River near Descanso, Cal., during the year ending Sept. 30, 1915.

Date.	Made by—	Gage height.	Discharge.	Date.	Made by—	Gage height.	Discharge.
		Feet.	*Sec.-ft.*			*Feet.*	*Sec.-ft.*
Dec. 19	F. C. Ebert	0.80	1.7	Mar. 29	F. C. Ebert	1.47	27
19	do	.82	1.8	Apr. 4	do	1.36	19
Jan. 27	do	.88	2.3	May 18	do	1.92	87
Feb. 1	do	1.53	30	July 8	do	1.15	5.5
4	do	1.67	51	8	do	1.15	5.4
5	do	1.61	41	Aug. 13	R. W. Day	1.09	1.2
Mar. 5	do	1.93	86	Sept. 18	F. C. Ebert	.94	.8
5	do	1.91	82				

Daily discharge, in second-feet, of Sweetwater River near Descanso, Cal., for the year ending Sept. 30, 1915.

Day.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.
1	0.1	0.8	1.0	1.0	50	95	22	109	37	6.5	2.5	0.9
2	.1	.8	1.0	.9	326	108	21	194	36	6.5	2.5	.9
3	.1	.8	1.0	.9	121	90	21	278	35	6.5	2.5	.9
4	.1	.8	1.0	1.2	46	95	19	480	34	6	2.5	.9
5	.1	.8	.9	1.1	34	95	19	990	32	6	2	.9
6	.2	.8	.9	1.1	30	84	19	524	31	6	2	.9
7	.2	.8	.9	1.0	28	75	19	310	30	6	2	.9
8	.3	.8	1.0	1.0	24	70	18	293	29	5.5	2	.9
9	.3	1.2	1.0	1.0	22	65	18	234	27	5.5	1.5	.9
10	.4	1.0	1.0	1.0	360	62	18	170	26	5.5	1.5	.9
11	.4	1.0	1.0	1.0	769	60	18	141	25	5.5	1.5	.8
12	.5	.9	1.6	1.0	170	58	18	137	24	5	1.5	.8
13	.5	.9	1.2	1.0	108	55	19	121	22	5	1.5	.8
14	.5	.9	1.2	1.0	81	47	21	109	21	5	1.5	.8
15	.5	.9	1.2	1.0	73	42	24	95	20	5	1	.8
16	.5	.9	1.3	1.0	76	39	21	78	19	4.5	1	.8
17	.5	.9	2.0	1.0	93	35	22	65	17	4.5	1	.8
18	.5	.9	1.7	1.0	68	31	24	106	16	4.5	1	.8
19	.6	.9	1.4	1.0	62	29	21	75	15	4.5	1	.8
20	.6	.9	1.5	1.0	108	28	21	71	14	4	1	.7
21	.8	.9	1.4	1.0	95	27	30	62	12	4	1	.7
22	.8	.9	1.3	9.0	86	27	83	57	11	4	1	.6
23	.8	.9	1.2	4.0	65	27	40	50	10	4	1	.6
24	.8	.9	1.2	3.2	55	27	37	47	9	3.5	1	.6
25	.8	.9	1.2	3.7	78	27	35	46	8	3.5	1	1.1
26	.8	.9	1.2	3.2	61	27	29	45	7	3.5	.9	1.2
27	.8	.9	1.2	2.5	52	25	28	44	7	3.5	.9	1.4
28	.8	.9	1.1	7.9	51	24	50	42	7	3	.9	1.4
29	.8	.9	1.0	220	......	25	88	41	7	3	.9	1.4
30	.8	.9	1.0	234	......	25	127	40	6.5	3	.9	1.4
31	.8	......	1.0	62	......	24	......	39	......	3	.9	......

NOTE.—See "Accuracy" in station description. No gage-height record Oct. 1-10, 16, and Dec. 24-26; discharge estimated.

Monthly discharge of Sweetwater River near Descanso, Cal., for the year ending Sept. 30, 1915.

Month.	Discharge in second-feet.			Run-off (total in acre-feet).	Accuracy.
	Maximum.	Minimum.	Mean.		
October	0.8	0.1	0.51	31	D.
November	1.2	.8	.89	53	D.
December	2.0	.9	1.18	73	C.
January	234	.9	18.4	1,130	B.
February	769	22	114	6,330	C.
March	108	24	49.9	3,070	B.
April	127	18	31.7	1,890	B.
May	990	39	164	10,100	C.
June	37	6.5	19.8	1,180	D.
July	6.5	3	4.69	288	D.
August	2.5	.9	1.40	86	D.
September	1.4	.6	.91	54	D.
The year	990	.1	33.5	24,300	

SWEETWATER RIVER NEAR DEHESA, CAL.

LOCATION.—In the NW. ¼ NW. ¼ sec. 20, T. 16 S., R. 2 E., San Diego County, 1,000 feet below mouth of Lawson Creek, and about 3 miles southeast of Dehesa.

DRAINAGE AREA.—112 square miles (measured on topographic maps).

RECORDS AVAILABLE.—December 4, 1913, to September 30, 1915.

Gage.—Bristol water-stage recorder on left bank 100 feet above control, and vertical staff in two sections bolted to solid rock at same site. February 5, 1915, water-stage recorder was moved downstream to a point on left bank 5 feet above control. Original datum was maintained, but there is some slope to the water surface between the two sites. Water-stage recorder not in operation after April 10. After this date readings of the staff gage were taken when current-meter measurements were made.

Discharge measurements.—Made from cable 200 feet below concrete control or by wading.

Channel and control.—Bed composed of shifting sand overlying solid rock. A concrete control extending to bedrock has been constructed. Both banks are high and not subject to overflow. Point of zero flow, zero on gage.

Extremes of discharge.—Maximum stage during year and period 1913–1915 from water-stage recorder, 5.8 feet February 11, 1915 (discharge, about 1,750 second-feet, determined from extension of rating curve); maximum stage doubtless occurred May 5, 1915, but water-stage recorder was not in operation (mean daily discharge, estimated, 1,290 second-feet). Practically no flow August 12 to September 30, 1915.

Diversions.—About 0.3 second-foot is diverted for irrigation at Ellis ranch near Descanso.

Regulation.—None.

Accuracy.—Results good for periods when water-stage recorder was operating satisfactorily. Water-stage recorder not in operation January 28 to 31, and the record April 15 to June 15 was not satisfactory; discharge estimated as about 130 per cent of flow of Sweetwater River near Descanso; discharge after June 15 interpolated between measurements. Moving of gage February 5 made it necessary to rerate the station.

Discharge measurements of Sweetwater River near Dehesa, Cal., during the year ending Sept. 30, 1915.

Date.	Made by—	Gage height.	Discharge.	Date.	Made by—	Gage height.	Discharge.
		Feet.	*Sec.-ft.*			*Feet.*	*Sec.-ft.*
Oct. 19	F. C. Ebert	0.08	[a] 0.05	Mar. 7	Owen	2.00	138
Jan. 31	J. F. Covert	2.00	132	15	C. L. Fulton	1.60	75
Feb. 5	.....do	1.70	69	Apr. 1	F. C. Ebert	1.01	35
12	Owen	3.00	397	1	R. W. Day	1.01	34
12	.....do	2.75	316	5	J. F. Covert	.97	32
14	.....do	2.1	171	14	C. L. Fulton	1.25	38
17	.....do	1.93	130	June 22	.....do	1.00	15
28	C. L. Fulton	1.65	86	July 9	Covert and Fulton	[b] .65	5

[a] Estimated.

[b] Mean of two measurements.

Daily discharge, in second-feet, of Sweetwater River near Dehesa, Cal., for the year ending Sept. 30, 1915.

Day.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.
1	0.1	0.6	1.0	68	198	39	140	49	9	0.5
2	.1	.4	1.0	202	240	34	250	47	9	.5
3	.1	.4	1.0	392	183	36	360	45	8	.4
4	.1	.4	1.0	140	172	36	625	42	8	.4
5	.1	.4	1.0	85	179	32	1,290	40	7	.4
6	.2	.4	1.3	79	156	28	680	38	7	.3
7	.2	.4	1.3	63	133	27	405	36	6	.3
8	.2	.4	1.4	55	114	27	380	33	5	.2
9	.2	.4	1.8	55	117	29	305	31	5	.2
10	.2	.4	1.5	219	122	25	220	29	5	.1
11	.3	.6	1.4	909	131	30	185	27	4	.1
12	.3	.9	1.4	369	119	34	180	24	3	....
13	.4	.6	1.3	233	101	36	160	22	3	....
14	.4	.4	1.3	154	87	38	140	20	3	....
15	.4	.4	1.5	124	84	31	125	18	3	....
16	.3	.4	1.5	124	81	27	100	15	3	....
17	.3	.6	1.4	124	78	29	85	15	3	....
18	.3	1.1	1.3	104	75	31	140	15	3	....
19	.3	1.5	1.3	96	72	27	100	15	2.5	....
20	.4	1.4	1.4	148	70	27	92	15	2.5	....
21	.4	1.1	1.7	187	68	39	81	15	2	....
22	.4	.9	6.5	124	66	110	74	15	2	....
23	.4	.9	7.1	119	50	52	65	15	1.5	....
24	.3	.9	4.7	103	50	48	61	14	1.5	....
25	.3	1.1	4.7	129	42	46	60	13	1	....
26	.3	1.3	5.2	116	41	38	58	13	1	....
27	.3	1.4	5.0	96	40	36	57	12	.9	....
28	.3	1.3	10	87	39	65	55	11	.8	....
29	.3	1.2	284	....	42	115	53	11	.7	....
30	.3	1.0	302	....	39	165	52	10	.6	....
31	....	1.0	80	....	37	....	51	....	.5	....

NOTE.—Discharge determined from two rating curves as follows: Oct. 1 to Feb. 5, well defined between 4 and 300 second-feet; Feb. 6 to Apr. 12, fairly well defined below 590 second-feet. Mean discharge for October estimated as in monthly table. Discharge Nov. 1–10, Dec. 3–9, Mar. 15–21, 26 and 27, Apr. 11 and 13, estimated. See remarks under "Acurracy" in station description. River practically dry Aug. 12 to Sept. 30.

Monthly discharge of Sweetwater River near Dehesa, Cal., for the year ending Sept. 30, 1915.

Month.	Discharge in second-feet.			Run-off (total in acre-feet).	Accuracy.
	Maximum.	Minimum.	Mean.		
October	....	....	[a] 0.05	3	D.
November	0.4	0.1	.27	16	D.
December	1.5	.4	.78	48	D.
January	302	1.0	23.8	1,460	D.
February	909	55	168	9,330	B.
March	240	37	97.6	6,000	C.
April	165	25	44.6	2,650	D.
May	1,290	51	214	13,200	D.
June	49	10	23.5	1,400	D.
July	9	.5	3.60	221	D.
August	0.5	.0	.11	7	D.
September	.0	.0	.0	....	
The year	1,290	.0	47.4	34,300	

[a] Estimated.

SAN DIEGO RIVER BASIN.

SAN DIEGO RIVER AT DIVERTING DAM NEAR LAKESIDE, CAL.

Location.—In the NE. ¼ sec. 11, T. 14 S., R. 2 E., San Diego County, at diverting-dam for San Diego flume, about 1,000 feet below mouth of Boulder Creek, and 13 miles northeast of Lakeside.

Drainage area.—102 square miles (measured on topographic maps).

Records available.—October 1, 1912, to September 30 1915.

Gage.—Vertical staff fastened to upstream face of dam on left bank; read three times a day by watchman of Cuyamaca Water Co.

Discharge measurements.—Made from cable one-fourth mile below dam or by wading.

Channel and control.—Concrete diversion dam serves as control. The channel above and below dam composed of shifting sand.

Extremes of discharge.—Maximum stage recorded during year, 11.6 feet at 7 a. m. March 20 (discharge, determined from extension of rating curve revised for this report, 2,380 second-feet); no flow over dam for several months during year, as water was diverted into San Diego flume.

1912–1915: Maximum stage recorded, 11.6 feet January 27, 1914 and March 20, 1915 (discharge from revised rating curve, 2,380 second-feet); no flow over dam for several months during each year.

Diversions.—Intake of the San Diego flume is at left end of diverting dam (see San Diego flume at diverting dam near Lakeside, pp. 40–41); no diversions above station.

Regulation.—See Boulder Creek near Julian for amount of stored water released from Cuyamaca reservoir; capacity of reservoir, 11,400 acre-feet.

Accuracy.—Results good for discharge over dam. Rating curve fairly well defined except for extremely high water. Total flow of San Diego River at this point is obtained by combining flow over dam, discharge through sand gates (estimated by engineers of the Cuyamaca Water Co.), and discharge of San Diego flume at diverting dam.

Discharge measurements of San Diego River at diverting dam near Lakeside, Cal., during the year ending Sept. 30, 1915.

[Made by F. C. Ebert.]

Date.	Gage height.	Discharge.
	Feet.	*Sec.-ft.*
Feb. 3	10.20	269
6	9.80	57

Daily discharge, in second-feet, of San Diego River over diverting dam near Lakeside, Cal., for the year ending Sept. 30, 1915.

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.
1	....	58	319	2	126	31	1.5
2	....	295	203	0	222	31	0
3	....	362	146	0	287	28	0
4	....	157	130	0	416	28	0
5	....	83	126	0	1,520	28	0
6	....	55	94	0	380	26	0
7	....	33	90	0	216	24	0
8	....	24	126	0	152	17	0
9	....	15	69	0	117	12	2
10	....	530	83	0	80	10	.5
11	....	850	83	0	52	10	....
12	....	509	69	0	31	10	....
13	....	222	55	0	130	10	....
14	....	162	50	0	117	8.5	....
15	....	112	42	19	90	7	....
16	....	168	39	14	90	5	....
17	....	179	19	6	83	3	....
18	....	130	14	3	389	2	....
19	....	94	12	0	99	0	....
20	....	179	8.5	0	86	0	....
21	....	157	10	.5	69	0	....
22	....	104	10	174	72	2	....
23	3.5	90	9	90	69	1	....
24	0	112	7	168	55	0	....
25	0	162	4.5	104	55	0	....
26	0	99	3.5	66	50	0	....
27	0	86	4.5	0	47	0	....
28	0	72	10	0	42	0	....
29	425	....	23	0	42	0	....
30	488	....	8.5	152	39	0	....
31	130	....	7	....	83	....	....

NOTE.—No flow Oct. 1 to Jan. 22 and July 11 to Sept. 30.

Monthly discharge of San Diego River over diverting dam near Lakeside, Cal., for the year ending Sept. 30, 1915.

Month.	Discharge in second-feet.			Run-off (total in acre-feet).	Accuracy.
	Maximum.	Minimum.	Mean.		
October	0	0	0.0	0	......
November	0	0	.0	0	......
December	0	0	.0	0	......
January	488	0	33.8	2,080	B.
February	850	15	182	10,100	B.
March	319	3.5	60.5	3,720	B.
April	174	0	26.6	1,580	B.
May	1,520	31	170	10,500	B.
June	31	0	9.78	582	C.
July	2	0	.13	8	C.
August	0	0	.0	0	......
September	0	0	.0	0	......
The year	1,520	0	39.4	28,600	

Daily discharge, in second-feet, of sand gates in diverting dam near Lakeside, Cal., for the year ending Sept. 30, 1915.

Day.	Mar.	Apr.	May.	Day.	Mar.	Apr.	May.	Day.	Mar.	Apr.	May.
1	......	11	95	11	12	8.5	94	21	11	......	......
2	......	11	95	12	12	8.5	75	22	11	......	......
3	8.5	11	95	13	11	9	......	23	11	......	......
4	12	10	97	14	11	11	......	24	11	......	......
5	12	9.5	100	15	11	11	......	25	11	......	......
6	12	10	97	16	11	11	......	26	11	18	......
7	12	10	95	17	11	11	......	27	11	118	......
8	12	10	95	18	11	11	......	28	11	98	......
9	12	9.5	95	19	11	11	......	29	11	118	......
10	12	9	95	20	11	41	......	30	11	80	......
								31	11	......	......

Monthly discharge of sand gates in diverting dam near Lakeside, Cal., for the year ending Sept. 30, 1915.

Month.	Discharge in second-feet.			Run-off (total in acre-feet).
	Maximum.	Minimum.	Mean.	
October	0	0	0.0	0
November	0	0	.0	0
December	0	0	.0	0
January	0	0	.0	0
February	0	0	.0	0
March	12	0	10.5	646
April	118	0	22.2	1,320
May	100	0	36.4	2,240
June	0	0	.0	0
July	0	0	.0	0
August	0	0	.0	0
September	0	0	.0	0
The year	118	0	5.81	4,210

Total daily discharge, in second-feet, of San Diego River[a] *at diverting dam near Lakeside, Cal., for the year ending Sept. 30, 1915.*

Day.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.
1	......	2.0	......	3.0	83	349	39	224	60	16.5	8.0	8.0
2	......	1.6	......	2.9	312	231	36	321	60	15	6.7	8.4
3	6.0	2.3	......	2.6	364	186	35	399	57	14.5	6.9	6.9
4	3.5	3.8	......	2.5	159	174	34	528	57	14.5	8.7	7.6
5	1.9	4.9	......	2.4	96	170	34	1,620	57	14	8.4	8.0
6	2.0	3.3	......	2.4	65	138	35	492	54	12.5	8.4	6.7
7	1.7	3.3	......	2.4	56	134	35	338	52	12	8.4	8.9
8	1.5	3.3	......	2.4	49	170	34	277	45	10.5	8.7	8.9
9	1.1	3.3	......	1.8	40	108	30	242	40	12.5	9.6	8.7
10	.9	3.9	......	1.9	546	120	28	205	38	11	9.3	9.8
11	1.4	3.2	......	2.5	851	118	26	176	38	11	9.3	9.8
12	1.9	3.3	......	2.6	509	106	26	137	37	9.6	8.9	9.8
13	1.6	1.9	......	2.4	229	91	27	161	35	7.3	7.8	9.8
14	1.4	2.5	......	2.4	174	87	28	148	34	9.3	7.1	8.2
15	1.2	2.3	......	2.4	114	79	46	121	32	8.2	7.1	8.2
16	1.3	1.3	......	2.4	176	76	40	121	30	6.9	7.3	8.4
17	1.2	......	......	2.4	187	56	32	114	28	9.1	6.3	8.2
18	1.2	......	......	2.5	138	51	29	420	27	7.8	6.3	4.8
19	1.3	......	......	1.9	113	48	28	130	25	7.6	6.3	4.8
20	1.3	......	......	2.1	195	46	54	117	25	8.2	7.3	5.0
21	1.5	......	......	2.4	174	47	16.5	100	21	8.0	7.6	6.5
22	1.6	......	......	6.2	126	47	184	103	23	7.8	6.5	6.3
23	1.6	......	4.3	19	117	46	100	98	23	8.2	5.8	6.3
24	1.6	......	4.3	18	143	44	178	84	22	8.7	5.4	6.3
25	1.9	......	3.8	12.5	192	42	114	84	22	12	6.3	6.5
26	2.3	......	3.0	12.5	131	40	102	79	18	8.9	7.3	6.5
27	2.5	......	3.9	15	118	42	124	76	18	8.7	4.8	6.7
28	2.0	......	4.3	9.4	104	47	102	71	18	8.4	4.8	5.4
29	1.9	......	3.6	434	......	60	121	71	17.5	8.7	5.4	5.6
30	1.9	......	3.6	498	......	46	238	68	14	8.7	6.1	5.6
31	1.9	......	3.3	144	......	44	......	62	......	7.6	6.7	......

[a] Includes flow over dam, through sand sluice gate, and in flume. No record on flume Oct. 1, 2, and Nov. 17 to Dec. 22. For record of flow in flume see pp. 41–43.

Total monthly discharge of San Diego River[a] *at diverting dam near Lakeside, Cal., for the year ending Sept. 30, 1915.*

Month.	Discharge in second-feet.			Run-off (total in acre-feet).
	Maximum.	Minimum.	Mean.	
October 3-31	6.0	0.9	1.83	105
November 1-16	4.9	1.3	2.89	92
December 23-31	4.3	3.0	3.79	68
January	498	1.8	39.3	2,420
February	851	40	199	11,100
March	349	40	98.2	6,040
April	238	16.5	65.2	3,880
May	1,620	62	232	14,300
June	60	14	34.2	2,040
July	16.5	6.9	10.1	621
August	9.6	4.8	7.21	443
September	9.8	4.8	7.35	437

[a] Includes flow over dam, through sand sluice gate, and in flume. For record of flow in flume see pp. 41–43.

SAN DIEGO RIVER AT LAKESIDE, CAL.

Location.—On El Cajon grant, San Diego County, just above ford on Lakeside and Padre Barona Valley road, three-fourths mile above Cuyamaca & Eastern Railroad bridge, three-fourths mile north of Lakeside, and about a mile above mouth of San Vicente Creek.

Drainage area.—203 square miles (measured on topographic maps).

Records available.—December 3, 1905, to September 30, 1915.

Gage.—Staff in three sections on left bank 100 feet above ford; read once daily by J. H. Beadle; extra readings taken during high water.

Discharge measurements.—Made from cable at gage or by wading.

Channel and control.—Channel composed of sand; very shifting. Both banks fairly high; overflow unusual.

Extremes of discharge.—Maximum stage recorded during year, 6.2 feet at 7 a. m. February 11 (discharge, from extension of rating curve, 2,270 second-feet); no flow for several months during the year.

1906–1915: Maximum stage recorded, gage under water at 5 a. m. March 25, 1906 (top of gage at 7.86 feet; discharge, determined from extension of rating curve, about 5,200 second-feet); no flow for long periods each year.

Diversions.—San Diego flume heads at diverting dam about 1,000 feet below Boulder Creek and about 15 miles above station. Several pumping plants 1 to 3 miles above the station obtain water for irrigation from wells along banks of stream. Cuyamaca reservoir, on the headwaters of Boulder Creek, has a capacity of 11,400 acre-feet. See also Boulder Creek near Julian.

Regulation.—None except as noted above.

Accuracy.—Results only fair on account of shifting channel. Daily discharge determined from fairly well defined rating curves applicable for short periods and by indirect method for shifting control.

Discharge measurements of San Diego River at Lakeside, Cal., during the year ending Sept. 30, 1915.

Date.	Made by—	Gage height.	Discharge.	Date.	Made by—	Gage height.	Discharge.
		Feet.	*Sec.-ft.*			*Feet.*	*Sec.-ft.*
Jan. 29	F. C. Ebert	2.46	94	Mar. 9	F. C. Ebert	2.74	153
30	do	4.35	1,170	18	R. W. Day	2.48	66
31	do	3.16	252	26	do	2.35	46
Feb. 1	do	2.56	88	27	F. C. Ebert	2.34	44
2	do	3.26	414	31	do	2.38	45
3	K. B. Sleppy	4.08	854	Apr. 2	R. W. Day	2.33	38
5	F. C. Ebert	2.68	121	3	F. C. Ebert	2.32	37
8	K. B. Sleppy	2.19	43	9	R. W. Day	2.28	23
9	F. C. Ebert	2.14	34	May 18	F. C. Ebert	3.03	242
Mar. 3	do	3.07	252	June 21	McClung and Ellis	2.18	13
4	do	3.07	251	July 8	F. C. Ebert	2.07	.6
6	do	2.88	203	Aug. 2	do	1.81	[a].1
8	Ebert and Keenan	2.80	174				

[a] Estimated.

Daily discharge, in second-feet, of San Diego River at Lakeside, Cal., for the year ending Sept. 30, 1915.

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.
1	....	97	234	48	346	67	6	0.1
2	....	280	270	42	480	66	5	.1
3	....	905	270	34	505	64	5	.1
4	....	290	270	32	530	63	4	.1
5	....	126	234	30	1,290	62	3	.1
6	....	86	217	28	580	54	2	....
7	....	62	217	26	410	43	1	....
8	....	50	200	24	410	37	.5	....
9	....	36	186	24	388	36	.5	....
10	....	252	153	24	270	28	.5	....
11	....	1,580	190	24	432	27	.5	....
12	....	608	145	24	234	26	.4	....
13	....	410	128	18	200	25	.4	....
14	....	346	112	18	200	24	.4	....
15	....	186	98	18	186	23	.4	....
16	....	171	85	37	143	17	.4	....
17	....	234	73	24	143	16	.4	....
18	....	200	71	24	234	15	.3	....
19	....	131	71	18	215	11	.3	....
20	....	143	62	13	180	14	.3	....
21	....	270	62	18	150	13	.3	....
22	....	200	53	288	135	12	.3	....
23	....	143	46	432	134	12	.3	....
24	....	131	46	186	108	11	.2	....
25	....	143	53	200	118	10	.2	....
26	....	217	46	186	117	10	.2	....
27	....	143	46	131	104	9	.2	....
28	....	119	44	157	91	8	.2	....
29	160	....	58	157	80	8	.2	....
30	900	....	57	252	78	7	.1	....
31	270	....	48	....	77	....	.1	....

NOTE.—River dry Oct. 1 to Jan. 28 and Aug. 6 to Sept. 30.

Monthly discharge of San Diego River at Lakeside, Cal., for the year ending Sept. 30, 1915.

Month.	Discharge in second-feet.			Run-off (total in acre-feet).	Accuracy.
	Maximum.	Minimum.	Mean.		
October	0.0	0.0	0.0	0	
November	.0	.0	.0	0	
December	.0	.0	.0	0	
January	900	.0	42.9	2,640	C.
February	1,580	36	270	15,000	C.
March	270	44	124	7,620	C.
April	432	13	84.6	5,030	D.
May	1,290	77	276	17,000	D.
June	67	7	27.3	1,620	D.
July	6	.1	1.08	66	D.
August	.1	.0	.02	1	
September	.0	.0	.0	0	
The year	1,580	.0	67.6	49,000	

Combined daily discharge, in second-feet, of San Diego River and flume near Lakeside, Cal., for the year ending Sept. 30, 1915.

Day.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.
1	3.3	2.8	......	3.3	116	252	66	356	76	19	10	1.4
2	3.5	3.0	......	3.9	300	288	60	490	75	18.5	8.1	10
3	3.8	2.8	......	2.3	911	288	52	515	73	14.5	8.1	7.5
4	6.3	3.5	......	2.5	295	288	50	540	74	12.5	9.9	8.5
5	2.5	4.8	......	3.0	142	252	48	1,300	75	11	9.3	9.0
6	2.5	3.8	......	3.2	98	236	46	587	66	11	8.2	7.2
7	2.8	3.8	......	3.0	78	236	44	420	57	9.5	8.0	11
8	2.5	3.8	......	2.8	71	218	42	424	53	12	8.0	8.8
9	1.6	4.6	......	2.1	57	204	42	408	51	13	8.5	7.2
10	1.8	4.6	......	2.2	270	171	42	292	43	14.5	10	9.0
11	1.8	3.8	......	2.0	1,580	207	42	454	43	14	9.8	9.0
12	1.8	5.0	......	2.2	608	162	42	256	41	13.5	9.2	9.0
13	1.8	2.3	......	2.1	410	144	38	222	37	9.9	8.8	9.0
14	1.8	1.5	......	2.2	346	127	38	222	36	11.5	7.2	1.9
15	1.8	1.0	......	2.3	186	112	40	208	38	11	7.7	1.5
16	2.0	1.3	......	2.1	171	102	58	165	31	9.9	7.0	1.9
17	2.0	1.5	......	2.3	234	92	46	162	30	11.5	7.2	1.9
18	2.0	.3	......	2.3	202	90	46	250	30	8.3	5.5	6.0
19	2.0	......	......	2.1	134	90	40	227	25	8.5	6.8	5.1
20	2.0	......	......	1.5	160	80	35	188	26	8.8	7.0	5.1
21	2.0	......	......	1.6	282	83	38	156	24	8.3	7.2	6.5
22	2.1	......	......	3.9	216	73	298	140	24	8.3	6.8	6.5
23	2.2	......	......	13	161	65	442	141	25	7.8	6.0	6.2
24	2.0	......	3.3	16.5	152	64	196	117	24	9.2	4.9	7.0
25	2.0	......	4.1	16.5	164	72	210	125	23	12	6.5	7.0
26	2.0	......	4.6	14.5	238	66	201	126	21	10	8.8	7.5
27	1.8	......	3.3	17	164	64	141	113	19	10	6.0	6.2
28	1.8	......	3.8	12.5	137	62	166	100	18	10	5.8	3.9
29	1.8	......	3.8	168	......	76	165	90	18	10	5.8	4.3
30	1.8	......	4.1	910	......	76	264	88	21	9.3	7.0	4.3
31	2.8	......	3.7	284	......	66	......	86	......	9.9	7.2	......

NOTE.—For record of flow in flume see pp. 41–43.

Combined monthly discharge of San Diego River and flume near Lakeside, Cal., for the year ending Sept. 30, 1915.

Month.	Discharge in second-feet.			Run-off (total in acre-feet).	Accuracy.
	Maximum.	Minimum.	Mean.		
October	6.3	1.6	2.32	143	C.
November	5.0	.0	1.81	108	C.
December	4.6	.0	.99	61	B.
January	910	1.5	48.6	2,990	C.
February	1,580	57	282	15,700	C.
March	288	62	142	8,730	C.
April	442	35	101	6,010	D.
May	1,300	86	289	17,800	D.
June	76	18	39.9	2,370	C.
July	19	7.8	11.2	689	C.
August	10	4.9	7.62	469	C.
September	11	1.4	6.31	375	C.
The year	1,580	.0	76.5	55,400	

NOTE.—For record of flow in flume see pp. 41–43.

SAN DIEGO RIVER NEAR SANTEE, CAL.

LOCATION.—At Old Mission dam in El Cajon grant, San Diego County, below Spring Canyon and just above Oak Canyon, about 4½ miles west of Santee.

DRAINAGE AREA.—375 square miles (measured on topographic maps).

Records available.—May 25, 1912, to September 30, 1915.

Gage.—Staff in three sections; lower section bolted to upstream face of old dam to the right of the break; other sections on left bank just above dam. Gage read daily by an employee of La Mesa Mutual Water Co.

Discharge measurements.—Made from cable about 500 feet above gage or by wading.

Channel and control.—Bed composed of sand; shifting. The old dam serves as a partial control. May 10, 1913, a concrete weir, with steel plates for crest and sides, was installed at old break in dam. This weir was partly destroyed February 2, 1915.

Extremes of discharge.—Maximum stage recorded during year and period 1912–1915, 13.6 feet at 10.30 a. m. February 11, 1915 (discharge, 3,960 second-feet); channel dry for several months each year, except for a small amount of ground water rising to the surface at the dam.

Diversions.—See San Diego River at Lakeside. Water for irrigation is pumped from wells along the river below Lakeside.

Regulation.—None except as noted for station at Lakeside.

Accuracy.—Results good except for the periods January 1 to 28 and May 30 to June 30, when the gage was read about once a week only.

Discharge measurements of San Diego River near Santee, Cal., during the year ending Sept. 30, 1915.

Date.	Made by—	Gage height.	Discharge.	Date.	Made by—	Gage height.	Discharge.
		Feet.	*Sec.-ft.*			*Feet.*	*Sec.-ft.*
Jan. 22	Lee and Sleppy	8.14	17	Apr. 1	Ebert and Day	7.85	55
29	F. C. Ebert	12.26	1,050	3	F. C. Ebert	7.83	51
30	.....do	12.86	1,980	16	R. W. Day	7.37	28
31	.....do	11.30	492	May 18	F. C. Ebert	9.80	219
Feb. 3	K. B. Sleppy	11.85	931	June 21	McClung and Ellis	7.70	14
8	.....do	9.20	112	July 7	F. C. Ebert	6.77	[a] .1
Mar. 4	F. C. Ebert	10.80	430	Aug. 1	.....do	6.30	[a] .05
9	.....do	9.77	219				

[a] Estimated.

Daily discharge, in second-feet, of San Diego River near Santee, Cal., for the year ending Sept. 30, 1915.

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	Day.	Jan.	Feb.	Mar.	Apr.	May.	June.
1	0.1	209	738	64	515	41	16	.1	289	167	39	141	1
2	.1	1,840	660	59	830	37	17	.1	334	142	34	155	4
3	.1	1,160	450	54	970	34	18	.1	380	130	29	269	6
4	.1	570	465	51	1,320	30	19	.1	310	119	22	250	9
5	.1	332	355	45	2,120	27	20	.1	480	109	70	186	11
6	.1	250	332	39	895	20	21	.1	530	99	119	128	14
7	.1	185	289	36	615	14	22	16	380	89	430	104	12
8	.1	120	232	34	570	13	23	1.9	269	72	319	94	10
9	.1	105	206	29	465	11	24	1.0	215	72	430	75	8
10	.1	710	198	26	405	10	25	.5	465	72	212	66	6
11	.1	3,410	310	22	355	8	26	.2	289	64	167	58	4
12	.1	1,060	263	22	289	7	27	.1	232	64	142	66	2
13	.1	638	228	22	234	5	28	.1	198	64	109	58	.1
14	.1	465	196	22	202	4	29	1,090	......	80	263	51	.1
15	.1	332	181	30	170	3	30	2,060	......	72	550	48	.1
							31	500	......	68	......	44	......

Note.—Discharge determined from four rating curves; the first, applicable Oct. 1 to Feb. 2, is well defined; the others, applicable Feb. 3 to Mar. 11, Mar. 12 to May 5, May 6 to Sept. 30, respectively, are fairly well defined. Practically no flow during October, November, December, July, August, and September, except the ground water which came to the surface at the dam and which amounted to about one-tenth second-foot or less.

Monthly discharge of San Diego River near Santee, Cal., for the year ending Sept. 30, 1915.

Month.	Discharge in second-feet.			Run-off (total in acre-feet).	Accuracy.
	Maximum.	Minimum.	Mean.		
October				0	
November				0	
December				0	
January	2,060	0.1	118	7,260	A.
February	3,410	105	563	31,300	B.
March	738	64	212	13,000	C.
April	550	22	116	6,900	C.
May	2,120	44	379	23,300	C.
June	41	.1	11.7	696	D.
July				0	
August				0	
September				0	
The year				82,500	

NOTE.—For conditions during October, November, December, July, August, and September, see footnote to daily discharge table.

SAN DIEGO RIVER NEAR SAN DIEGO, CAL.

LOCATION.—At Murray Canyon ford, in Ex Mission San Diego grant, San Diego County, about 3¾ miles north of San Diego, 2½ miles above station maintained during 1913–14, and 4 miles above mouth.

DRAINAGE AREA.—431 square miles (measured on topographic maps).

RECORDS AVAILABLE.—December 20, 1914, to September 30, 1915, at present location; October 1, 1912, to December 19, 1914, at old location of station, 2½ miles downstream.

GAGE.—Vertical staff in two sections just above ford; lower section is in center of channel and upper section is on left bank. Previous gage, 2½ miles down stream, was not at same datum. Gage read twice a day by Harry Lewis; frequent readings during floods.

DISCHARGE MEASUREMENTS.—Made from highway bridge at San Diego 2½ miles below gage or by wading. New gage is read frequently when measurements are made from bridge.

CHANNEL AND CONTROL.—Bed is composed of sand and is shifting. Concrete driveway built across channel acts as a part control. Results not very satisfactory owing to collection of sand on the concrete.

EXTREMES OF DISCHARGE.—Maximum stage recorded during year, 6.8 feet at 3 p. m. February 11 (discharge, 2,900 second-feet); no flow for several months during the year.

1912–1915: Maximum stage recorded, 16.61 feet (old gage at county bridge) at 4 p. m. February 21, 1914 (discharge, computed from extension of rating curve, 9,500 second-feet); no flow for several months each year.

DIVERSIONS.—See San Diego River near Santee. Water is also pumped from gravels in Mission Valley above station. Record at this station shows quantity of water wasted into Pacific Ocean.

REGULATION.—None except as noted for station at Lakeside.

ACCURACY.—Changes in rating curve caused by shifts in control fairly well defined by discharge measurements. Results good.

Discharge measurements of San Diego River near San Diego, Cal., during the year ending Sept. 30, 1915.

Date.		Made by—	Gage height.	Discharge.	Date.		Made by—	Gage height.	Discharge.
			Feet.	*Sec.-ft.*				*Feet.*	*Sec.-ft.*
Jan.	29	Lee and McFadden	2.68	574	Apr.	19	W. D. McFadden	1.92	17
	29	do	3.43	955	May	5	Isbell and McFadden	4.95	1,130
	30	W. D. McFadden	5.92	2,380		20	F. C. Ebert	2.90	187
Feb.	2	Keenan and Armstrong	4.78	1,690	June	2	D. L. Lee	2.42	65
	9	F. C. Ebert	2.34	107		21	McClung and Ellis	1.90	1
Mar.	9	do	3.02	250	Aug.	1	F. C. Ebert		0
Apr.	3	Ebert and Keenan	2.38	55					

Daily discharge, in second-feet, of San Diego River near San Diego, Cal., for the year ending Sept. 30, 1915.

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	Day.	Jan.	Feb.	Mar.	Apr.	May.	June.
1		390	425	55	385	74	16		405	155	17	200	12
2		1,310	740	45	530	74	17		385	145	23	165	10
3		2,120	640	40	425	74	18		365	130	26	215	2
4		1,110	465	38	555	70	19		345	120	15	250	15
5		635	425	35	1,160	63	20		310	100	8	178	1
6		400	310	40	885	55	21		740	90	5	165	.7
7		315	310	37	780	53	22		485	85	100	160	.6
8		160	280	38	535	53	23		310	80	215	160	.4
9		100	245	40	468	42	24		260	75	215	148	.3
10		590	235	37	400	36	25		345	70	185	135	.2
11		2,480	220	27	302	34	26		385	65	165	125	.1
12		1,940	210	20	285	28	27		245	60	120	118	.1
13		1,200	195	15	250	25	28		245	55	110	110	.1
14		780	185	16	215	22	29	780		65	110	103	
15		465	170	16	215	16	30	2,240		60	170	90	
							31	1,200		60		74	

NOTE.—Discharge determined from four well-defined rating curves applicable for short periods and by indirect method for shifting control. No flow Oct. 1 to Jan. 28 and June 29 to Sept. 30.

Monthly discharge of San Diego River near San Diego, Cal., for the year ending Sept. 30, 1915.

Month.	Discharge in second-feet.			Run-off (total in acre-feet).	Accuracy.
	Maximum.	Minimum.	Mean.		
October	0.0	0.0	0.0	0	
November	.0	.0	.0	0	
December	.0	.0	.0	0	
January	2,240	.0	136	8,360	A.
February	2,480	100	672	37,300	C.
March	740	55	209	12,900	C.
April	215	5	66.1	3,930	C.
May	1,160	74	316	19,400	B.
June	74	.0	25.4	1,510	C.
July	.0	.0	.0	0	
August	.0	.0	.0	0	
September	.0	.0	.0	0	
The year	2,480	.0	115	83,400	

BOULDER CREEK AT CUYAMACA RESERVOIR, NEAR JULIAN, CAL.

LOCATION.—At outlet of Cuyamaca reservoir, in Cuyamaca grant, San Diego County, 7 miles south of Julian, and 12 miles above mouth of Boulder Creek.

DRAINAGE AREA.—12.0 square miles (measured on topographic maps).

RECORDS AVAILABLE.—June 19, 1912, to September 30, 1915.

Gage.—Vertical staff on right side of weir box, 3½ feet above weir; zero at elevation of crest of the 6-foot Cippoletti weir 100 feet below outlet gates of reservoir. Gage read daily by an employee of the Cuyamaca Water Co.

Discharge measurements.—Made by wading 50 feet below weir. On account of velocity of approach it has been necessary to rate weir.

Channel and control.—Cippoletti weir acts as permanent control.

Extremes of discharge.—Maximum stage recorded during year and period 1912–1915, 0.84 foot July 24 and 25, 1915 (discharge, 18 second-feet). No water released from reservoir except when needed for San Diego flume.

Winter flow.—No water is released from the reservoir during the winter season.

Diversions.—None.

Regulation.—Flow completely regulated by operation of outlet gate of reservoir. Cuyamaca dam, completed in 1886, was one of the first earth dams built in California to store water for irrigation. The dam was originally 35 feet high, but in 1894 was enlarged, increasing the capacity of the reservoir to 11,400 acre-feet. The present dam is 635 feet long and 41½ feet high, with an inner slope of 2:1 and an outer slope of 1½:1. From the reservoir the water flows 12½ miles down the natural channel of Boulder Creek and San Diego River to the intake of San Diego flume.

Accuracy.—Results excellent.

Discharge measurements of Boulder Creek at Cuyamaca reservoir, near Julian, Cal., during the year ending Sept. 30, 1915.

Date.	Made by—	Gage height.	Discharge.	Date.	Made by—	Gage height.	Discharge.
		Feet.	*Sec.-ft.*			*Feet.*	*Sec.-ft.*
Oct. 11	F. C. Ebert	0.24	3.0	Sept. 18	F. C. Ebert	.32	3.9
Nov. 4	W. J. Isbell	.71	13.7	18	.....do	.43	6.0
8	.....do	.22	2.3				

Daily discharge, in second-feet, of Boulder Creek at Cuyamaca reservoir, near Julian, Cal., for the year ending Sept. 30, 1915.

Day.	Oct.	Nov.	July.	Aug.	Sept.	Day.	Oct.	Nov.	July.	Aug.	Sept.
1	2.3	3.3	......	3.1	7.8	16	3.0	......	......	6.7	4.2
2	1.4	3.3	......	3.6	7.8	17	3.0	......	......	5.3	4.2
3	.0	6.2	......	4.2	7.8	18	3.0	......	......	5.2	4.2
4	.0	7.4	......	5.6	6.8	19	2.5	......	......	5.2	5.4
5	.0	1.2	......	7.0	5.6	20	2.0	......	2.1	6.5	5.4
6	.0	1.0	......	8.3	5.6	21	1.1	......	2.8	8.3	7.7
7	.0	1.0	......	8.3	5.6	22	.7	......	3.0	8.3	7.6
8	.0	1.0	......	8.3	5.6	23	.7	......	5.2	7.2	7.6
9	.0	.3	......	8.3	5.6	24	1.7	......	9.2	6.8	7.6
10	.0	......	......	9.4	7.6	25	2.0	......	12	5.6	7.6
11	2.5	......	......	11	8.5	26	2.0	......	3.6	6.8	6.5
12	3.3	......	......	11	8.6	27	2.6	......	4.9	5.8	6.5
13	3.0	......	......	7.9	8.6	28	3.3	......	6.7	5.6	6.5
14	2.3	......	......	7.8	7.2	29	3.3	......	6.7	5.6	5.6
15	3.0	......	......	7.8	5.4	30	3.3	......	5.8	5.6	5.6
						31	3.3	......	4.0	6.5	......

Note.—Discharge determined from a well-defined rating curve. No flow Nov. 10 to July 19.

Monthly discharge of Boulder Creek at Cuyamaca reservoir, near Julian, Cal., for the year ending Sept. 30, 1915.

Month.	Discharge in second-feet.			Run-off (total in acre-feet).	Accuracy.
	Maximum.	Minimum.	Mean.		
October	3.3	0.0	1.78	109	C.
November	7.4	.0	.82	49	C.
December	.0	.0	.0	0	
January	.0	.0	.0	0	
February	.0	.0	.0	0	
March	.0	.0	.0	0	
April	.0	.0	.0	0	
May	.0	.0	.0	0	
June	.0	.0	.0	0	
July	12	.0	2.13	131	B.
August	11	3.1	6.86	422	B.
September	8.6	4.2	6.54	389	B.
The year	12	.0	1.52	1,100	

BOULDER CREEK AT MOUTH, NEAR LAKESIDE, CAL.

Location.—In the NW. ¼ sec. 12, T. 14 S., R. 2 E., San Diego County, just above junction with San Diego River, about 14 miles northeast of Lakeside.

Drainage area.—33.5 square miles (measured on topographic maps).

Records available.—August 12, 1912, to September 30, 1915.

Gage.—Vertical staff, installed March 1, 1914, on right-wing wall of weir box, 300 feet above mouth of creek, at same datum as gage destroyed by the flood in January, 1914. When the station was established, a weir without end contractions was installed. The gage, which was fastened to the left side of the box, was at same elevation as crest of weir. Weir board was removed November 9, 1912, and gage readings were obtained by measuring from a reference point until January 22, 1913, when a vertical staff was installed on left bank in pool above weir box; datum 2.0 feet below original gage. Gage usually read twice a day by an employee of the Cuyamaca Water Co.

Discharge measurements.—Made from foot plank over flume or by wading.

Channel and control.—The weir box acts as a control. Both banks are fairly high and not subject to overflow. Bed is composed of boulders, sand, and gravel.

Extremes of discharge.—Maximum stage recorded 1912–1915, 5.15 feet at 6 a. m. February 11, 1915 (discharge, 200 second-feet); no flow July 2 to 8, 1914.

Diversions.—None.

Regulation.—Water is stored at Cuyamaca Reservoir and released during low-water period. See Boulder Creek near Julian.

Accuracy.—Results good.

Discharge measurements of Boulder Creek at mouth, near Lakeside, Cal., during the year ending Sept. 30, 1915.

Date.	Made by—	Gage height.	Discharge.	Date.	Made by—	Gage height.	Discharge.
		Feet.	*Sec.-ft.*			*Feet.*	*Sec.-ft.*
Oct. 17	F. C. Ebert	1.01	2.0	May 12	McClung and Harritt	3.00	65
Feb. 3	do	2.83	66	19	do	2.50	46
6	do	1.74	20	26	do	2.05	27
Mar. 10	Day and Munday	2.10	29	June 2	do	1.82	19
17	do	1.75	19	9	do	1.62	14
24	do	1.57	13	16	do	1.48	10
31	F. C. Ebert	1.53	13	23	do	1.38	8.0
Apr. 7	R. W. Day	1.45	10	30	D. A. McClung	1.25	6.1
14	do	1.39	9.6	July 10	F. C. Ebert	1.15	4.6
21	do	1.93	27	Sept. 24	do	1.32	6.1

Daily discharge, in second-feet, of Boulder Creek at mouth, near Lakeside, Cal., for the year ending Sept. 30, 1915.

Day.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.
1	3.0	3.3	1.7	2.7	40	46	11	61	21	6.0	5.2	7.8
2	3.2	3.3	1.7	2.3	92	46	10	76	19	5.6	4.8	8.4
3	4.2	3.3	2.0	2.3	86	48	10	71	20	5.4	5.0	9.4
4	3.5	3.4	1.5	2.3	38	42	9.0	81	19	5.4	5.8	9.6
5	1.8	7.8	1.5	2.5	46	40	9.4	190	18	5.0	6.2	7.4
6	1.0	3.8	1.6	2.5	19	38	10	152	16	4.7	7.8	7.4
7	1.5	2.4	1.6	2.5	14	36	9.8	134	15	4.6	7.8	7.4
8	1.5	2.2	1.6	2.6	12	34	7.4	116	15	4.4	8.0	7.4
9	1.5	2.0	1.7	2.6	10	30	9.0	104	13	4.4	7.8	7.2
10	1.4	11	1.7	3.0	76	30	8.4	92	12	4.4	7.6	7.8
11	1.5	2.1	1.7	2.6	183	34	8.0	76	12	4.1	9.4	8.2
12	2.0	2.1	3.1	2.6	110	28	8.0	68	12	4.1	9.4	8.2
13	2.2	2.0	3.0	2.5	22	25	7.8	61	12	3.8	9.0	8.2
14	2.2	1.5	2.7	2.5	42	24	8.6	54	11	3.8	7.6	8.2
15	2.4	1.5	2.9	2.6	32	21	11	46	9.8	3.8	7.6	7.8
16	2.5	1.5	2.2	2.6	30	20	9.4	42	9.6	3.5	7.4	7.0
17	2.5	1.5	2.3	2.5	34	19	8.4	40	9.0	3.4	7.0	4.7
18	1.5	1.5	8.0	2.4	26	18	8.2	46	8.6	3.2	5.4	4.7
19	1.5	1.5	4.2	2.3	22	14	7.8	44	8.6	3.1	5.4	5.0
20	1.8	1.5	4.1	2.3	34	16	7.4	40	8.2	3.1	4.7	5.0
21	1.6	1.4	3.8	2.2	42	15	13	36	8.2	3.3	5.8	5.8
22	2.0	1.4	3.2	6.8	32	15	40	32	8.0	4.4	7.0	7.0
23	1.5	1.4	3.1	6.4	28	13	40	30	7.8	5.4	7.0	6.6
24	1.2	1.5	3.5	4.2	26	13	56	28	7.4	5.8	7.2	7.0
25	1.2	1.5	3.1	4.4	42	12	34	26	7.2	17	5.8	7.4
26	1.1	1.5	2.9	5.0	32	12	28	26	7.2	6.0	5.8	7.4
27	1.0	1.6	2.8	3.6	26	12	25	24	7.0	5.0	4.8	6.6
28	1.5	1.6	2.5	4.1	23	12	24	23	6.8	7.4	6.2	6.6
29	2.1	1.6	2.8	68	......	16	28	22	6.0	7.6	5.4	6.6
30	2.3	1.7	2.7	116	......	13	76	22	6.2	8.0	5.0	5.4
31	3.4	......	2.7	44	......	12	......	21	......	6.8	6.2	......

NOTE.—Discharge determined from a rating curve fairly well defined between 1 and 80 second-feet. Discharge estimated Nov. 22–30, Dec. 5–9, and interpolated Mar. 16.

Monthly discharge of Boulder Creek at mouth, near Lakeside, Cal., for the year ending Sept. 30, 1915.

Month.	Discharge in second-feet.			Run-off (total in acre-feet).	Accuracy.
	Maximum.	Minimum.	Mean.		
October	4.2	1.0	1.99	122	C.
November	11	1.4	2.46	146	C.
December	8.0	1.5	2.71	167	C.
January	116	2.2	10.2	627	B.
February	183	10	43.5	2,420	B.
March	48	12	24.3	1,490	B.
April	76	7.4	18.1	1,080	B.
May	190	21	60.8	3,740	B.
June	21	6.0	11.4	678	B.
July	17	3.1	5.24	322	B.
August	9.4	4.7	6.62	407	B.
September	9.6	4.7	7.11	423	B.
The year	190	1.0	16.0	11,600	

SAN DIEGO FLUME AT DIVERTING DAM NEAR LAKESIDE, CAL.

Location.—In the SE. ¼ sec. 11, T. 14 S., R. 2 E., San Diego County, just below intake, at diverting dam about 13 miles northeast of Lakeside.

Records available.—May 4, 1912, to September 30, 1915.

Gage.—Sanders & Rising water-stage recorder installed at left side of flume about 500 feet below intake and a short distance above sand box; replaced December 24, 1914, by a Friez water-stage recorder.

Discharge measurements.—Made from foot plank across flume at gage.

Channel and control.—The flume is lined with tar paper to reduce leakage. The elevation of the flume appears to vary slightly with the quantity of water flowing.

Extremes of discharge.—Maximum daily discharge 1912–1915 was 51 second-feet, March 24, 1913. No flow for certain periods nearly every year.

Accuracy.—Measurements sufficient to determine changes in the flume were made. Results good.

San Diego flume diverts water from San Diego River and water from the South Fork of San Diego River is diverted into it. The flume is 6 feet wide, 24 inches deep, and more than 30 miles long. It carries water into La Mesa reservoir, about 8 miles northeast of San Diego. This system supplied the city of San Diego with water until 1906, when the Southern California Mountain Water Co. extended its system to the city. It now supplies water for irrigating about 4,000 acres, and 7 per cent of the flow is used for domestic service. The Capitan Grande Indian Reservation has a water right of 0.8 second-feet from this flume. At the sand box, just below the gage, water is occasionally wasted into San Diego River.

Discharge measurements of San Diego flume at diverting dam near Lakeside, Cal., during the year ending Sept. 30, 1915.

Date.	Made by—	Gage height.	Discharge.	Date.	Made by—	Gage height.	Discharge.
		Feet.	*Sec.-ft.*			*Feet.*	*Sec.-ft.*
Oct. 16	F. C. Ebert	0.32	1.2	Mar. 24	R. W. Day	1.63	25
16	.....do	.12	0	25	.....do	1.62	26
17	.....do	.36	1.5	31	F. C. Ebert	1.63	26
Dec. 23	D. A. McClung	.56	4.8	Apr. 7	R. W. Day	1.60	26
Jan. 7	.....do	.43	2.5	8	.....do	1.55	25
13	.....do	.43	2.3	14	.....do	1.10	15.6
20	.....do	.43	2.1	15	.....do	1.10	15.9
27	.....do	1.18	17.5	21	.....do	1.29	23
28	.....do	.87	10.5	22	.....do	.86	11
Feb. 6	Lee and Ebert	.92	12.0	29	Day and McClung	.51	4.1
14	W. S. Post	1.74	34	May 12	McClung and Harritt	1.68	32
17	R. W. Day	.76	8	19	.....do	1.65	31
18	.....do	.75	7.8	26	.....do	1.68	30
24	.....do	1.69	32	June 2	.....do	1.68	29
25	.....do	1.69	32	9	.....do	1.70	29
Mar. 3	.....do	1.67	31	16	.....do	1.59	25
4	.....do	1.68	32	23	.....do	1.48	21
10	.....do	1.59	26	30	D. A. McClung	1.16	13.6
11	.....do	1.60	26	July 10	F. C. Ebert	.97	10.8
17	.....do	1.60	25	Sept. 24	.....do	.77	6.2
18	.....do	1.60	24				

Daily discharge, in second-feet, of San Diego flume at diverting dam near Lakeside, Cal., for the year ending Sept. 30, 1915.

Day.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.
1		2.0	....	3.0	25	30	26	3.3	29	15	8.0	8.0
2		1.6	....	2.9	17.5	28	25	3.8	29	15	6.7	8.4
3	6.0	2.3	....	2.6	1.5	32	24	17	29	14.5	6.9	6.9
4	3.5	3.8	....	2.5	2.0	32	24	15.5	29	14.5	8.7	7.6
5	1.9	4.9	....	2.4	12.5	32	24	3.3	29	14	8.4	8.0
6	2.0	3.3	....	2.4	10	32	25	15.5	28	12.5	8.4	6.7
7	1.7	3.3	....	2.4	23	32	25	27	28	12	8.4	8.9
8	1.5	3.3	....	2.4	25	32	24	30	28	10.5	8.7	8.9
9	1.1	3.3	....	1.8	25	27	21	30	28	10.5	9.6	8.7
10	.9	3.9	....	1.9	16	25	19	30	28	10.5	9.3	9.8
11	1.4	3.2	....	2.5	.6	23	17	30	28	11	9.3	9.8
12	1.9	3.3	....	2.6	.1	25	17	31	27	9.6	8.9	9.8
13	1.6	1.9	....	2.4	6.8	25	18	31	25	7.3	7.8	9.8
14	1.4	2.5	....	2.4	12.5	26	16.5	31	25	9.3	7.1	8.2
15	1.2	2.3	....	2.4	2.0	26	15.5	31	25	8.2	7.1	8.2
16	1.3	1.3	....	2.4	8.1	26	15.5	31	25	6.9	7.3	8.4
17	1.2	....	....	2.4	8.1	26	15.5	31	25	9.1	6.3	8.2
18	1.2	....	....	2.5	7.8	26	15	31	25	7.8	6.3	4.8
19	1.3	....	....	1.9	19	25	17.5	31	25	7.6	6.3	4.8
20	1.3	....	....	2.1	16	26	13.5	31	25	8.2	7.3	5.0
21	1.5	....	....	2.4	17.5	26	16	31	21	8.0	7.6	6.5
22	1.6	....	....	6.2	22	26	10.5	31	21	7.8	6.5	6.3
23	1.6	....	4.3	15.5	27	26	10	29	22	8.2	5.8	6.3
24	1.6	....	4.3	18	31	26	10.5	29	22	8.7	5.4	6.3
25	1.9	....	3.8	12.5	30	26	10.5	29	22	12	6.3	6.5
26	2.3	....	3.0	12.5	32	26	17.5	29	18	8.9	7.3	6.5
27	2.5	....	3.9	15	32	26	6.4	29	18	8.7	4.8	6.7
28	2.0	....	4.3	9.4	32	26	3.5	29	18	8.4	4.8	5.4
29	1.9	....	3.6	8.5	....	26	2.6	29	17.5	8.7	5.4	5.6
30	1.9	....	3.6	10	....	26	5.7	29	14	8.7	6.1	5.6
31	1.9	....	3.3	14.5	....	26	....	29	....	7.6	6.7	....

NOTE.—Discharge determined from three fairly well-defined rating curves, each applicable for two short periods. No record Oct. 1-2 and Nov. 17 to Dec. 22.

Monthly discharge of San Diego flume at diverting dam near Lakeside, Cal., for the year ending Sept. 30, 1915.

Month.	Discharge in second-feet.			Run-off (total in acre-feet).	Accuracy.
	Maximum.	Minimum.	Mean.		
October 3-31	6.0	0.9	1.83	105	C.
November 1-16	4.9	1.3	2.89	92	C.
December 23-31	4.3	3.0	3.79	68	C.
January	18	1.8	5.56	342	C.
February	32	.1	16.5	916	C.
March	32	23	27.2	1,670	C.
April	26	2.6	16.4	976	C.
May	31	3.3	26.0	1,600	C.
June	29	14	24.4	1,450	C.
July	15	6.9	9.99	614	C.
August	9.6	4.8	7.21	443	D.
September	9.8	4.8	7.35	437	D.

SAN DIEGO FLUME NEAR LAKESIDE, CAL.

LOCATION.—One-half mile above trestle crossing at Los Coches Creek, about 3 miles southeast of Lakeside, San Diego County, and bout 20 miles below intake on San Diego River.

RECORDS AVAILABLE.—January 1, 1907, to September 30, 1915.

GAGE.—Sanders & Rising water-stage recorder at patrolman's cabin one-half mile above trestle. Staff gage at same site as water-stage recorder on and after July 1, 1915. Staff-gage record is mean of three readings taken each day by an employee of the Cuyamaca Water Co. Position of gage has been changed slightly several times since the station was first established, but datum has always been same as elevation of floor of flume.

Discharge measurements.—Made from foot plank across flume at gage.

Channel and control.—In the fall of 1914 the flume was deepened 8 inches and more tar-paper lining was put in. Although the flume is in poor condition, the maximum discharge was greater then in previous years. Elevation of flume appears to vary slightly with quantity of water flowing.

Extremes of discharge.—The maximum mean daily discharge 1907–1915 was 22 second-feet April 19, 20 and May 10–16, 1915. No flow at certain times each year.

Diversions.—Water is diverted into the flume from South Fork of San Diego River, and a small quantity is diverted from this flume at Capitan Grande Indian Reservation above station.

Accuracy.—Results good. The frequent discharge measurements indicate unstable conditions. Daily discharge computed by indirect method and from rating curves covering short periods.

See description of San Diego flume at diverting dam near Lakeside, page 40.

Discharge measurements of San Diego flume near Lakeside, Cal., during the year ending Sept. 30, 1915.

Date.	Made by—	Gage height.	Discharge.	Date.	Made by—	Gage height.	Discharge.
		Feet.	*Sec.-ft.*			*Feet.*	*Sec.-ft.*
Oct. 5	F. C. Ebert	0.40	2.3	Mar. 24	R. W. Day	1.12	18.2
16	.....do	.36	2.1	29	F. C. Ebert	1.10	18.8
Dec. 30	D. A. McClung	.49	4.0	Apr. 1	.....do	1.10	18.7
Jan. 14	.....do	.44	2.0	7	R. W. Day	1.05	18
21	.....do	.41	1.5	14	.....do	1.11	21
27	F. C. Ebert	.84	13.6	21	.....do	1.10	21
30	D. A. McClung	.76	9.5	28	.....do	.67	8.2
31	F. C. Ebert	1.00	18.3	May 5	McClung and Harritt	.65	7
Feb. 4	Ebert and McClung	.56	4.6	12	.....do	1.18	22
4	F. C. Ebert	.56	4.7	18	F. C. Ebert	1.02	16.6
6	Lee and Ebert	.80	12	19	McClung and Harritt	.85	11.8
7	C. H. Lee	1.14	21	26	.....do	.75	8.9
10	D. A. McClung	1.16	21	June 2	.....do	.76	8.4
25	R. W. Day	1.19	23	9	.....do	.94	14.8
Mar. 3	.....do	1.04	18	16	.....do	.93	13.8
5	F. C. Ebert	1.06	18.8	21	McClung and Ellis	.85	11
10	R. W. Day	1.04	17.7	30	D. A. McClung	.92	12.4
17	.....do	1.19	18.7	July 8	F. C. Ebert	.90	13.3

Daily discharge, in second-feet, of San Diego flume near Lakeside, Cal., for the year ending Sept. 30, 1915.

Day.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.
1	3.3	2.8	......	3.3	18.5	18	18	10	8.5	13	10	1.4
2	3.5	3.0	......	3.9	19.5	18	18.5	9.5	8.7	13.5	8.0	10
3	3.8	2.8	......	2.3	6.3	18	18.5	10	8.6	9.5	8.0	7.5
4	6.3	3.5	......	2.5	4.7	18	18	10.5	10.5	8.5	9.8	8.5
5	2.5	4.8	......	3.0	15.5	18	18	5.2	13	8.0	9.2	9.0
6	2.5	3.8	......	3.2	12	18.5	18	6.9	12	9.0	8.2	7.2
7	2.8	3.8	......	3.0	16.5	18.5	18	9.6	14	8.5	8.0	11
8	2.5	3.8	......	2.8	21	18.5	18	14	16	11.5	8.0	8.8
9	1.6	4.6	......	2.1	21	18	18	19.5	15	12.5	8.5	7.2
10	1.8	4.6	......	2.2	17.5	18	18.5	22	15	14	10	9.0
11	1.8	3.8	......	2.0	.2	17	18.5	22	16	13.5	9.8	9.0
12	1.8	5.0	......	2.2	.0	16.5	18.5	22	15	13	9.2	9.0
13	1.8	2.3	......	2.1	.0	16	19.5	22	12	9.5	8.8	9.0
14	1.8	1.5	......	2.2	.0	15	20.5	22	12	11	7.2	1.9
15	1.8	1.0	......	2.3	.0	14	21.5	22	14.5	10.5	7.7	1.5
16	2.0	1.3	......	2.1	.0	17.5	21.5	22	14	9.5	7.0	1.9
17	2.0	1.5	......	2.3	.0	18.5	21.5	19	14	11	7.2	1.9
18	2.0	.3	......	2.3	1.5	18.5	21.5	16	15	8.0	5.5	6.0
19	2.0	......	......	2.1	3.4	18.5	22	12	14	8.2	6.8	5.1
20	2.0	......	......	1.5	17	18.5	22	8.2	12	8.5	7.0	5.1
21	2.0	......	......	1.6	11.5	21	20.5	5.5	11	8.0	7.2	6.5
22	2.1	......	......	3.9	16.5	20	10.5	5.5	11.5	8.0	6.8	6.5
23	2.2	......	......	13	18	19	10.5	6.9	13	7.5	6.0	6.2
24	2.0	......	3.3	16.5	20.5	18	10	8.7	13	9.0	4.9	7.0
25	2.0	......	4.1	16.5	20.5	18.5	10	6.9	13	12	6.5	7.0
26	2.0	......	4.6	14.5	20.5	19.5	15	9.2	11	10	8.8	7.5
27	1.8	......	3.3	17	20.5	18.5	10	9.0	10	10	6.0	6.2
28	1.8	......	3.8	12.5	18	18	9.4	9.1	10	10	5.8	3.9
29	1.8	......	3.8	7.5	......	18	8.1	9.7	10	9.8	5.8	4.3
30	1.8	......	4.1	9.7	......	18.5	12	9.6	14	9.2	7.0	4.3
31	2.8	......	3.7	14	......	18.5	......	9.5	......	9.8	7.2	......

NOTE.—See "Accuracy" in station description. Discharge Oct. 1-2 and Dec. 31 interpolated. No record Nov. 19 to Dec. 23; probably no flow.

Monthly discharge of San Diego flume near Lakeside, Cal., for the year ending Sept. 30, 1915.

Month.	Discharge in second-feet.			Run-off (total in acre-feet).	Accuracy.
	Maximum.	Minimum.	Mean.		
October	6.3	1.6	2.32	143	C.
November	5.0	.0	1.81	108	C.
December	4.6	.0	.99	61	
January	17	1.5	5.68	349	B.
February	21	.0	11.4	633	B.
March	21	14	18.0	1,110	B.
April	22	8.1	16.8	1,000	B.
May	22	5.2	12.7	781	B.
June	16	8.5	12.5	744	B.
July	14	7.5	10.1	621	B.
August	10	4.9	7.61	468	C.
September	11	1.4	6.31	375	C.
The year	22	.0	8.84	6,390	

SOUTH FORK OF SAN DIEGO RIVER NEAR ALPINE, CAL.

Location.—In the NE. ¼ sec. 10, T. 15 S., R. 2 E., in Capitan Grande Indian Reservation, San Diego County, about half a mile above junction with San Diego River, and 4 miles north of Alpine.

Drainage area.—44.5 square miles (measured on topographic maps).

Records available.—January 1, 1913, to September 30, 1915, when station was discontinued.

Gage.—Sanders & Rising water-stage recorder on left bank about 100 feet below intake of South Fork flume. Vertical staff fastened to outside of gage well was read during practically the entire season by patrolman of Cuyamaca Water Co., as the water-stage recorder was not operating satisfactorily.

Discharge measurements.—Made from bridge 1,500 feet below gage or by wading.

Channel and control.—Solid rock and gravel; rough.

Extremes of discharge.—Maximum stage recorded during year and period 1913–1915, 5.0 feet during morning of February 11, 1915 (discharge, 242 second-feet); no flow during several months each year.

Diversions.—South Fork flume, which heads above the station, diverts water into San Diego flume.

Regulation.—None.

Accuracy.—Rating curve fairly well defined, but the gage-height record not complete. Water-stage recorder was in operation only for a few days during the season. Daily discharge, for periods not covered by gage heights, estimated by comparison with records of flow at adjacent stations. Results fair.

Discharge measurements of South Fork of San Diego River near Alpine, Cal., during the year ending Sept. 30, 1915.

Date.	Made by—	Gage height.	Discharge.	Date.	Made by—	Gage height.	Discharge.
		Feet.	*Sec.-ft.*			*Feet.*	*Sec.-ft.*
Feb. 3	F. C. Ebert	2.30	38	Mar. 18	R. W. Day	....	.0
6	....do	.7	[a] 1	25	....do	....	.0

[a] Estimated.

Daily discharge, in second-feet, of South Fork of San Diego River near Alpine, Cal. for the year ending Sept. 30, 1915.

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	Day.	Jan.	Feb.	Mar.	Apr.	May.	June.
1	......	15	105	0.0	44	0.1	16	......	30	1.5	0.0	0.8	0.1
2	......	40	113	.0	25	.1	17	......	40	.0	.0	.2	......
3	......	35	71	.0	9.5	.1	18	......	35	.0	.0	3.5	......
4	......	5	39	.0	24	.1	19	......	20	.0	.0	.4	......
5	......	.7	24	.0	146	.1	20	......	24	.0	.0	.2	......
6	......	.5	21	.0	71	.1	21	0.1	44	.0	.0	.0	......
7	......	.5	24	.0	39	.1	22	.5	24	.0	.0	.0	......
8	......	.5	7.5	.7	18	.1	23	.0	24	.4	9.5	.0	......
9	......	.5	.5	.0	14	.1	24	.0	20	1	14	.0	......
10	......	4.4	6	.0	9.5	.1	25	.0	16	1	5	.0	......
11	......	217	3.5	.0	3.5	.1	26	.0	12	1	.5	.1	......
12	......	75	4.5	.0	1.5	.1	27	.0	11	1	.0	.0	......
13	......	50	3.5	.0	.5	.1	28	.1	10	1	.0	.0	......
14	......	40	2.5	.0	.2	.1	29	20	......	1	.0	.0	......
15	......	25	2.5	.0	1.5	.1	30	146	......	1	44	.0	......
							31	24	......	.5	......	.0	......

Note.—See "Accuracy" in station description. River dry Oct. 1 to Jan. 20 and June 17 to Sept. 30.

Monthly discharge of South Fork of San Diego River near Alpine, Cal., for the year ending Sept. 30, 1915.

Month.	Discharge in second-feet.			Run-off (total in acre-feet).	Accuracy.
	Maximum.	Minimum.	Mean.		
October	0.0	0.0	0.0	0	
November	.0	.0	.0	0	
December	.0	.0	.0	0	
January	146	.0	6.15	378	D.
February	217	.5	29.3	1,630	D.
March	113	.0	14.1	867	C.
April	44	.0	2.46	146	C.
May	146	.0	13.3	818	C.
June	.1	.0	.05	3	
July	.0	.0	.0	0	
August	.0	.0	.0	0	
September	.0	.0	.0	0	
The year	217	.0	5.30	3,840	

SOUTH FORK FLUME NEAR ALPINE, CAL.

Location.—In the NE. ¼ sec. 10, T. 15 S., R. 2 E., in Capitan Grande Indian Reservation, San Diego County, 100 feet below diversion dam, about half a mile above mouth of South Fork of San Diego River and 4 miles north of Alpine.

Records available.—January 10, 1913, to September 30, 1915, when station was discontinued.

Gage.—Sanders & Rising water-stage recorder on left side of flume 100 feet below intake. Vertical staff fastened to flume at same site is read occasionally by patrolman of the Cuyamaca Water Co.

Discharge measurements.—Made from foot plank across flume at gage.

Channel and control.—As gage is only a short distance above wasteway, the velocity depends largely on position of this gate.

Extremes of discharge.—The maximum discharge of the flume, 1913–1915, was 28 second-feet May 10 and 11, 1915.

Accuracy.—Current-meter measurements frequent, but owing to changes in the opening of the wasteway they do not determine a well-defined curve; daily discharge for greater part of year computed by indirect method for shifting control. Record from staff gage readings except February 7–10, March 4 to May 12, and June 2–23. Results fair.

South Fork flume is a feeder for San Diego flume. When water is not needed it is wasted into South Fork of San Diego River a short distance below gage in flume.

Discharge measurements of South Fork flume near Alpine, Cal., during the year ending Sept. 30, 1915.

Date.	Made by—	Gage height.	Discharge.	Date.	Made by—	Gage height.	Discharge.
		Feet.	*Sec.-ft.*			*Feet.*	*Sec.-ft.*
Feb. 3	D. A. McClung	1.20	[a] 8.7	Apr. 22	R. W. Day	0.56	12.9
6	F. C. Ebert	.65	7.6	28	Day and McClung	.98	16.2
7	....do	.89	8.6	May 5	McClung and Harritt	[b] .45	24
18	R. W. Day	.70	10.2	12	....do	[c] 1.50	27
25	....do	.97	9.7	19	....do	[d] 1.43	23
Mar. 4	....do	.78	12.1	26	....do	[e] 1.15	17.7
11	....do	1.18	23	June 2	....do	.94	14.7
18	....do	1.10	15.8	9	....do	[e] .78	10.2
25	....do	.60	8.1	16	....do	[e] .67	8.3
31	F. C. Ebert	.73	9.8	23	....do	.60	6.0
Apr. 7	R. W. Day	.60	8.4	30	D. A. McClung	.45	3.6
14	....do	.80	10.4	July 10	F. C. Ebert	.40	2.6

[a] Does not give flow past gage because made from bridge 1,000 feet below gage and below spillway.

[b] Waste gate inside of flume about 20 feet below gage partly open; sand gate in dam open; large flow in river; "Head gate dam full of water."

[c] Waste gate partly open; sand gate in dam open.

[d] Waste gate partly open; sand gate in dam partly open.

[e] Waste gate partly open.

Daily discharge, in second-feet, of South Fork flume near Alpine, Cal., for the year ending Sept. 30, 1915.

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.
1	0.0	16	14	10.5	16	15	3.8	0.3
2	.0	18	12.5	10	19	15	3.6	.3
3	.0	19.5	15.5	10.5	20	14	3.7	.3
4	.0	15	14.5	8.0	24	14	3.5	.3
5	.0	11	20	8.1	24	13.5	3.4	.2
6	.01	8.9	20	8.2	25	13	3.3	.2
7	.01	8.4	21	8.4	26	12	3.0	.2
8	.01	6.4	22	7.2	27	10.5	2.7	.1
9	.01	6.8	23	7.0	27	9.5	2.3	.1
10	.01	8.4	23	6.8	28	9.6	2.1	.0
11	.03	16	22	6.4	28	9.8	1.3	.0
12	.05	15	23	6.0	27	9.1	.5	.0
13	.05	14	25	5.6	27	8.9	.5	.0
14	.05	13	19	6.7	24	8.8	.5	.0
15	.05	12	13	10.5	24	8.6	.4	.0
16	.05	11	13.5	10.5	24	7.9	.4	.0
17	.05	10	16	10	22	7.4	.3	.0
18	.05	10	14	11	22	6.8	.3	.0
19	.0	12	12.5	12	24	6.6	.2	.0
20	.0	14	11.5	13	21	6.2	.2	.0
21	1.0	15	12	13	19	5.9	.2	.0
22	3.7	12.5	13	13	18	5.7	.2	.0
23	.6	18	13.5	17	17.5	5.6	.2	.0
24	.4	14	12	16	17	5.6	.3	.0
25	.4	10	8.7	15	17.5	5.0	.4	.0
26	.2	19.5	9.0	16.5	17.5	4.6	.5	.0
27	1.8	16	8.8	16.5	17	4.0	.4	.2
28	1.9	13	9.2	16	16	3.5	.3	.1
29	2.0	....	10	21	15	3.4	.3	.0
30	2.1	....	10	22	15	3.4	.3	.0
31	15	....	9.8	....	14.5	....	.3	.0

NOTE.—Discharge determined as follows: Jan. 1 to Feb. 5, from poorly-defined rating curve; July 11 to Aug. 28, from fairly well-defined rating curve. See "Accuracy" in station description. No flow Oct. 1 to Dec. 31 and Sept. 1–30.

Monthly discharge of South Fork of San Diego flume near Alpine, Cal., for the year ending Sept. 30, 1915.

Month.	Discharge in second-feet.			Run-off (total in acre-feet).	Accuracy.
	Maximum.	Minimum.	Mean.		
October	0.0	0.0	0.0	0	
November	.0	.0	.0	0	
December	.0	.0	.0	0	
January	15	.0	.953	59	D.
February	19.5	6.4	13.0	722	D.
March	25	8.7	15.2	935	C.
April	22	5.6	11.4	678	C.
May	28	14.5	21.4	1,320	C.
June	15	3.4	8.43	502	C.
July	3.8	.2	1.27	78	D.
August	.3	.0	.07	4	D.
September	.0	.0	.0	0	
The year	28	.0	5.93	4,300	

SAN VICENTE CREEK AT FOSTER, CAL.

Location.—In sec. 31, T. 14 S., R. 1 E., at old diversion dam, San Diego County, about three-eighths of a mile above Foster.

Drainage area.—74.9 square miles (measured on topographic maps).

Records available.—January 29 to April 4, 1915, when station was discontinued.

Gage.—Vertical staff in two sections fastened to solid rock on right bank about 25 feet above dam; read twice a day by A. E. Michael.

Discharge measurements.—Made from foot bridge at Foster or by wading near gage.

Channel and control.—Sand, gravel, and rock. Concrete dam forms control.

Extremes of discharge.—Maximum stage reported during the year, 6.5 feet February 11 (discharge, 1,190 second-feet); no flow for several months during the year.

Diversions.—None.

Regulation.—None.

Accuracy.—Rating curve well defined. Results good for period covered by gage-height record.

Discharge measurements of San Vicente Creek at Foster, Cal., during the year ending Sept. 30, 1915.

Date.	Made by—	Gage height.	Discharge.	Date.	Made by—	Gage height.	Discharge.
		Feet.	*Sec.-ft.*			*Feet.*	*Sec.-ft.*
Jan. 29	F. C. Ebert	3.71	148	Mar. 19	R. W. Day	3.00	28
31	....do	3.39	66	26	....do	2.78	15
Feb. 1	....do	3.23	37	27	F. C. Ebert	2.73	15
2	....do	5.35	723	29	....do	2.80	16
3	K. B. Sleppy	4.00	237	30	R. W. Day	2.76	12
4	F. C. Ebert	3.49	98	Apr. 2	....do	2.63	11
5	....do	....	50	4	W. E. Keenan	2.60	13
8	....do	....	27	5	Lee and Sleppy	2.58	10
25	D. L. Lee	3.46	102	9	R. W. Day	2.52	7.8
Mar. 4	F. C. Ebert	3.44	90	May 17	F. C. Ebert	2.80	28
6	Ebert and Keenan	3.35	72	June 1	D. L. Lee	2.41	5.6
8	F. C. Ebert	3.30	66				

Daily discharge, in second-feet, of San Vicente Creek at Foster, Cal., for the year ending Sept. 30, 1915.

Day.	Jan.	Feb.	Mar.	Apr.	Day.	Jan.	Feb.	Mar.	Apr.
1		37	135	12	16		92	33	
2		723	178	11	17		94	30	
3		237	102	10	18		81	28	
4		98	90	10	19		74	25	
5		50	78		20		96	22	
6		40	71		21		89	20	
7		30	67		22		78	20	
8		27	61		23		69	19	
9		20	54		24		62	19	
10		438	62		25		104	16	
11		783	60		26		84	16	
12		332	49		27		64	15	
13		115	44		28		64	20	
14		89	39		29	148		18	
15		90	35		30	500		16	
					31	66		14	

NOTE.—Discharge Jan. 29 to Feb. 9, estimated from results of discharge measurements and by comparison with records of flow for San Diego River at Lakeside; Feb. 15, 16, and 27, Mar. 18, 19, 25, 27, and 31 and Apr. 3, estimated by comparison with records of flow at Lakeside.

Monthly discharge of San Vicente Creek at Foster, Cal., for the year ending Sept. 30, 1915.

Month.	Discharge in second-feet.			Run-off (total in acre-feet).	Accuracy.
	Maximum.	Minimum.	Mean.		
February	783	20	149	8,280	B.
March	178	14	47.0	2,890	B.

SAN DIEGUITO RIVER BASIN.

SANTA YSABEL CREEK NEAR SANTA YSABEL, CAL.

LOCATION.—At bridge on Santa Ysabel-Warner Springs road, in Santa Ysabel grant, San Diego County, about 1½ miles north of Santa Ysabel.

DRAINAGE AREA.—12.8 square miles (measured on topographic maps).

RECORDS AVAILABLE.—August 29, 1913, to September 30, 1914, when station was discontinued. Discharge measurements only for 1914–15.

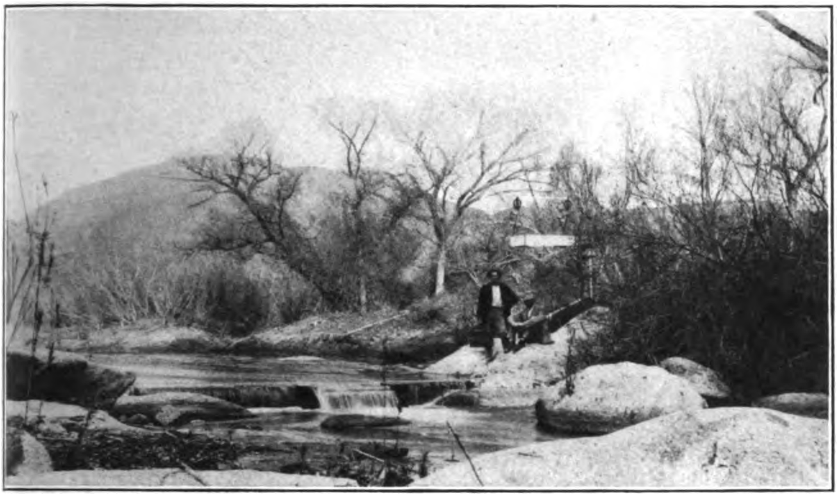
GAGE.—Vertical staff fastened to left abutment of bridge.

DISCHARGE MEASUREMENTS.—Made from bridge or by wading.

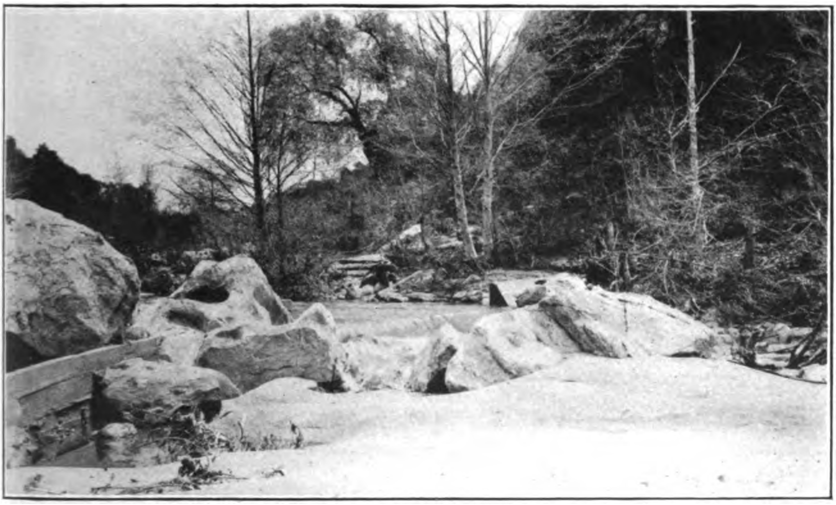
CHANNEL AND CONTROL.—Bed rock and boulders. October 5, 1913, a concrete control (Pl. III, *A*) was built across the channel just below gage.

DIVERSIONS.—A small ditch to divert water for irrigation was constructed during the summer of 1914 a short distance above station.

REGULATION.—None.



A. NOTCHED CONCRETE CONTROL ON SANTA YSABEL CREEK NEAR RAMONA, CAL.



B. CONCRETE WEIR ON SAN LUIS REY RIVER NEAR MESA GRANDE, CAL.

Discharge measurements of Santa Ysabel Creek near Santa Ysabel, Cal., during the year ending Sept. 30, 1915.

Date.	Made by—	Gage height.	Discharge.	Date.	Made by—	Gage height.	Discharge.
		Feet.	*Sec.-ft.*			*Feet.*	*Sec.-ft.*
Oct. 11	F. C. Ebert	0.71	0.4	July 10	F. C. Ebert	.82	3.1
Feb. 8	W. J. Isbell	1.04	14	10	W. J. Isbell	.84	3.3
Mar. 6	F. C. Ebert	1.30	31	28	.....do	.76	1.0
Apr. 23	W. J. Isbell	.97	9.3	Aug. 2	.....do	.76	.8
May 12	.....do	1.50	55	6	.....do	.72	.6
June 2	.....do	1.15	24	Sept. 10	.....do	.82	1.8
29	.....do	.89	5.0				

SANTA YSABEL CREEK NEAR MESA GRANDE, CAL.

Location.—In the NW. ¼ sec. 21, T. 12 S., R. 2 E., at Sutherland dam site, San Diego County, about 1 mile below Sutherland, 1½ miles above mouth of Black Canyon Creek, and 4½ miles southwest of Mesa Grande.

Drainage area.—53.4 square miles (measured on topographic maps).

Records available.—December 29, 1912, to September 30, 1915.

Gage.—Friez water-stage recorder on right bank just above Sutherland dam site.

Discharge measurements.—Made from cable at gage or by wading.

Channel and control.—Shifting sand. A concrete control was constructed at an outcrop of bedrock 20 feet below gage. Both banks are high, covered with brush and probably not subject to overflow. Point of zero flow, zero on gage.

Extremes of discharge.—Maximum stage during year, from water-stage recorder, 4.53 feet at 12.30 a. m. February 11 (discharge, 1,040 second-feet); minimum discharge, estimated 0.2 second-foot October 1 (water-stage recorder not in operation).

1912–1915: Maximum stage recorded February 11, 1915 (see preceding paragraph); no flow October 1–2, 1913, August 12–29, and September 6–13, 1914.

Diversions.—None of any importance above station.

Regulation.—None.

Accuracy.—Sand occasionally collects at the artificial control and causes slight changes in stage-discharge relation. Discharge for period March 3 to September 30 determined by indirect method for shifting control and from rating curves covering short periods. Results good.

Discharge measurements of Santa Ysabel Creek near Mesa Grande, Cal., during the year ending September 30, 1915.

Date.	Made by—	Gage height.	Discharge.	Date.	Made by—	Gage height.	Discharge.
		Feet.	*Sec.-ft.*			*Feet.*	*Sec.-ft.*
Dec. 14	D. A. McClung	0.47	3.3	June 9	W. J. Isbell	0.96	39
Jan. 18	.....do	.46	2.7	29	.....do	.81	17
25	.....do	.73	13	July 13	.....do	.66	10
Feb. 22	R. W. Day	1.40	84	20	.....do	.65	9.9
Mar. 8	.....do	1.38	100	27	.....do	.61	7.3
15	.....do	1.19	60	Aug. 3	.....do	.56	6.4
22	.....do	1.06	51	10	.....do	.49	3.4
Apr. 5	.....do	1.07	31	17	.....do	.49	3.4
12	.....do	.91	25	24	.....do	.47	3.4
19	.....do	.90	25	31	.....do	.46	3.2
May 11	W. J. Isbell	1.69	129	Sept. 14	.....do	.51	4.7
25	.....do	1.27	78	21	.....do	.45	2.9
June 1	.....do	1.11	63	28	.....do	.46	2.9

Daily discharge, in second-feet, of Santa Ysabel Creek near Mesa Grande, Cal., for the year ending Sept. 30, 1915.

Day.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.
1	0.2	0.9	2.7	4.1	60	181	37	255	60	13	6.5	3
2	.5	.9	4.1	4.1	278	215	35	379	56	13	6.5	3
3	.8	1.0	3.4	4.4	227	136	84	263	53	14	6.5	3
4	1.1	.8	3.4	4.4	107	130	32	240	54	14	5	3.5
5	1.4	.7	3.6	4.8	66	120	31	540	51	14	4.5	3.5
6	1.4	.5	3.4	4.8	53	110	34	313	47	14	4.5	3.5
7	1.4	.5	3.2	4.6	45	105	36	251	44	13	3.5	3.5
8	1.4	.5	2.7	4.8	42	100	37	214	41	12	3	3.5
9	1.4	1.3	2.7	5.5	52	94	35	180	41	12	3.5	3.5
10	1.1	2.7	2.5	5.3	455	115	26	153	39	11	3.5	3.5
11	.9	2.5	3.0	3.4	571	96	27	125	38	11	3.5	2.5
12	.8	2.3	6.2	3.4	332	88	25	116	37	10	3	.5
13	.5	2.1	4.8	3.4	181	78	25	108	36	10	3	1.5
14	.5	1.9	3.2	3.6	121	69	25	101	35	10	2.5	4
15	.5	1.7	3.0	3.4	91	62	30	99	34	10	2.5	4.5
16	.5	1.5	3.2	3.4	112	62	34	81	31	10	3	4.5
17	.5	1.3	5.3	3.6	134	60	29	98	30	10	3.5	4
18	.6	1.1	6.7	3.2	130	58	27	136	29	10	3.5	1
19	.7	.8	7.6	3.2	127	57	25	103	28	10	3	3
20	.5	.7	7.6	3.2	192	53	22	96	28	9.5	3	3
21	.8	.7	5.5	3.4	130	52	60	91	27	8	3	3
22	1.3	.7	5.7	14	93	51	107	87	26	8	2	3
23	1.2	1.1	6.0	7.6	84	48	63	77	25	8	1.5	3
24	.8	1.3	5.5	5.7	112	47	69	78	23	7.5	2.5	3
25	.5	1.3	5.3	10	192	44	52	75	22	7.5	3	3
26	.4	1.4	5.3	10	136	43	44	73	21	7.5	5.5	3
27	.4	1.4	4.6	8.1	125	40	44	70	21	7.5	7	3
28	.4	1.4	3.9	26	123	40	44	66	19	6.5	4.5	3
29	.4	1.6	3.9	471	......	42	60	66	17	6.5	4	3
30	.5	1.6	3.9	408	......	40	182	65	16	6.5	3.5	3
31	.8	......	4.1	78	......	38	......	62	......	7	3	......

NOTE.—Discharge, Oct. 1 to Mar. 2, determined from a fairly well-defined rating curve. See also "Accuracy" in the station description. Discharge, Oct. 1–4, Nov. 11–16, Feb. 1, and Mar. 4–7, estimated.

Monthly discharge of Santa Ysabel Creek near Mesa Grande, Cal., for the year ending Sept. 30, 1915.

Month.	Discharge in second-feet.			Run-off (total in acre-feet).	Accuracy.
	Maximum.	Minimum.	Mean.		
October	1.4	0.2	0.78	48	C.
November	2.7	.5	1.27	76	C.
December	7.6	2.5	4.39	270	C.
January	471	3.2	36.2	2,230	B.
February	571	42	156	8,660	B.
March	215	38	79.8	4,910	B.
April	182	22	44.4	2,640	B.
May	540	62	150	9,220	B.
June	60	16	34.4	2,050	B.
July	14	6.5	10.0	615	B.
August	7	1.5	3.77	232	C.
September	4.5	.5	3.07	183	C.
The year	571	.2	43.0	31,100	

SANTA YSABEL CREEK NEAR RAMONA, CAL.

Location.—In the NE. ¼ sec. 27, T. 12 S., R. 1 E., at Pamo, San Diego County, 1 mile below mouth of Temescal Creek, 4 miles north of Ramona, and about 5 miles above site of station maintained at mouth of canyon near Escondido from 1906 to 1910.

Drainage area.—110 square miles (measured on topographic maps).

Records available.—February 5, 1912, to September 30, 1915.

Gage.—Staff in four sections on left bank (short vertical section at control read at extremely low stages); read three times each day and more frequently during floods by C. M. De Venelle.

Discharge measurements.—Made from cable at gage or by wading.

Channel and control.—Channel composed of sand; somewhat shifting. November 19, 1912, a concrete control was built about 30 feet below gage.

Extremes of discharge.—Maximum stage recorded during year and period 1912–1915, 8.05 feet at 12.30 to 1.30 a. m., February 11 (discharge, 3,330 second-feet); minimum stage recorded, 0.74 foot October 1 to 7, 1914 (discharge, 0.1 second-foot).

Diversions.—None of any importance above station. Water is diverted from Santa Ysabel Creek near mouth of canyon, 5 miles below station, by East San Pasqual ditch, which takes out on left bank, and by West San Pasqual ditch, which takes out on right bank and below intake of East San Pasqual ditch.

Regulation.—None.

Accuracy.—Results good. The concrete control, except for short periods after high water, has proved very effective.

Discharge measurements of Santa Ysabel Creek near Ramona, Cal., during the year ending Sept. 30, 1915.

Date.	Made by—	Gage height.	Discharge.	Date.	Made by—	Gage height.	Discharge.
		Feet.	*Sec.-ft.*			*Feet.*	*Sec.-ft.*
Oct. 12	F. C. Ebert	0.84	0.2	May 27	R. W. Day	1.74	64
Dec. 12	D. A. McClung	1.24	10	Apr. 2	.....do	1.72	55
Jan. 14	Lee and Sleppy	1.16	5.8	9	.....do	1.66	45
16	D. A. McClung	1.15	4.6	17	.....do	1.61	41
17	.....do	1.15	4.1	May 7	.....do	3.02	326
23	.....do	1.34	15	7	.....do	3.06	373
24	.....do	1.26	11	7	.....do	2.94	315
Feb. 6	.....do	1.90	90	7	.....do	2.93	311
7	.....do	1.82	82	8	.....do	2.90	297
13	.....do	3.02	277	June 1	W. J. Isbell	1.84	72
20	R. W. Day	2.23	152	July 13	.....do	1.37	14
27	.....do	2.17	131	Aug. 10	.....do	1.15	3.9
Mar. 6	.....do	2.27	157	24	.....do	1.13	3.0
7	Ebert and Day	2.24	157	Sept. 16	F. C. Ebert	1.14	4.3
12	R. W. Day	2.11	119	28	W. J. Isbell	1.14	4.1
20	.....do	1.87	71				

Daily discharge, in second-feet, of Santa Ysabel Creek near Ramona, Cal., for the year ending Sept. 30, 1915.

Day.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.
1	0.1	1.9	4.6	5.8	151	278	56	393	74	26	9	3.5
2	.1	1.9	4.6	5.8	460	412	54	628	67	24	8.5	3.5
3	.1	1.4	4.3	5.8	365	223	55	470	70	25	8	4
4	.1	.2	3.8	7.0	170	203	52	375	69	26	8	5
5	.1	.4	4.0	7.5	115	184	55	850	67	24	8	5
6	.1	.4	4.3	7.0	88	161	60	438	66	24	7	4
7	.1	.4	4.6	6.4	76	152	55	350	60	23	6	4
8	.2	.3	4.0	5.8	67	144	52	283	62	22	5.5	3.5
9	.2	2.8	3.8	7.0	62	134	49	255	55	22	5	3.5
10	.2	18	4.3	7.5	1,080	172	44	220	54	22	4.5	3
11	.6	4.6	5.2	6.1	1,250	136	38	190	54	19	4.5	2.5
12	.5	3.4	10	5.8	510	125	38	170	52	17	4.5	1.5
13	.5	2.6	7.0	6.1	270	113	38	160	49	15	4.5	1.5
14	.4	2.4	5.5	6.1	230	106	42	140	46	14	4	4.5
15	.4	2.4	5.5	6.4	185	97	52	135	44	14	4	4
16	.4	1.8	5.5	5.8	180	88	45	125	41	14	3.5	4
17	.4	1.4	8.5	5.8	190	86	41	120	41	14	5	4
18	.5	1.3	12	5.5	135	84	38	225	42	13	6	3.5
19	.5	.7	9.0	4.9	120	84	39	145	38	12	5.5	3.5
20	.6	.6	10	4.6	203	76	38	130	38	11	5	4
21	.9	.6	9.5	5.5	198	70	138	120	37	9.5	4.5	4
22	1.4	.9	8.0	25	152	69	263	110	36	9	4	3.5
23	1.6	1.3	8.5	13	136	67	123	110	34	9	2.5	3.5
24	1.3	1.3	6.7	10	150	66	142	103	32	10	3.5	3.5
25	.9	1.2	6.4	19	278	62	88	100	32	9.5	4	5
26	.8	1.3	7.0	17	168	61	74	90	32	9.5	110	5.5
27	.7	1.4	7.0	13	142	58	67	89	32	9	20	5.5
28	.7	1.8	7.0	21	132	61	74	82	30	9	9	5
29	.7	2.0	6.7	915	....	77	125	80	28	9	7	5
30	1.1	2.2	5.8	760	....	64	412	79	27	9.5	3.5	4.5
31	1.6	....	6.7	255	....	60	....	73	....	9.5	3	....

NOTE.—Discharge, except as noted below, determined from two fairly well-defined rating curves. Indirect method for shifting control used Feb. 12–19 and May 6–31.

Monthly discharge of Santa Ysabel Creek near Ramona, Cal., for the year ending Sept. 30, 1915.

Month.	Discharge in second-feet.			Run-off (total in acre-feet).	Accuracy.
	Maximum.	Minimum.	Mean.		
October	1.6	0.1	0.57	35	D.
November	18	.2	2.10	125	C.
December	12	3.8	6.45	397	B.
January	915	4.6	70.2	4,320	B.
February	1,250	62	259	14,400	B.
March	412	58	122	7,500	B.
April	412	38	81.6	4,860	B.
May	850	73	221	13,600	C.
June	74	27	47.0	2,800	B.
July	26	9	15.6	959	C.
August	110	2.5	9.26	569	C.
September	5.5	1.5	3.90	232	D.
The year	1,250	.1	68.7	49,800	

SAN DIEGUITO RIVER AT BERNARDO, CAL.

LOCATION.—At highway bridge at Bernardo, in San Bernardo grant, San Diego County, 5 miles below junction of Santa Ysabel and Santa Maria creeks, and 16 miles above mouth of river.

DRAINAGE AREA.—266 square miles (measured on topographic maps).

RECORDS AVAILABLE.—April 17, 1912, to September 30, 1915.

GAGE.—Standard chain fastened to upstream side of bridge near left bank; read twice daily by S. C. Smith.

Discharge measurements.—Made from car and cable 30 feet above gage or by wading.

Channel and control.—Composed of sand; shifting. Left bank subject to overflow at flood stages.

Extremes of discharge.—Maximum stage recorded during year and period 1912–1915, 17.8 feet February 11 (discharge, 5,050 second-feet). Practically no flow for several months each year.

Diversions.—East and West San Pasqual ditches divert water for irrigation from the Santa Ysabel at the upper end of San Pasqual Valley (see Santa Ysabel Creek near Ramona). Water for irrigation is also pumped from wells along the river.

Accuracy.—Discharge determined from fairly well-defined rating curves and by indirect method for shifting channels. Results fair.

Discharge measurements of San Dieguito River at Bernardo, Cal., during the year ending Sept. 30, 1915.

Date.	Made by—	Gage height.	Discharge.	Date.	Made by—	Gage height.	Discharge.
		Feet.	*Sec.-ft.*			*Feet.*	*Sec.-ft.*
Jan. 26	F. C. Ebert	10.18	[a] 0.1	Mar. 27	F. C. Ebert	10.40	64
31	K. B. Sleppy	11.83	382	Apr. 6	.....do	10.50	58
Feb. 10	F. C. Ebert	14.47	[b] 1,580	10	R. W. Day	10.21	30
11	.....do	15.75	[c] 3,110	May 6	C. E. Hickok	12.52	683
12	.....do	12.81	861	17	F. C. Ebert	10.89	158
Mar. 2	.....do	12.16	470	20	.....do	11.01	156
3	.....do	11.71	368	July 6	W. E. Keenan	9.70	2.6
10	.....do	11.35	230	7	F. C. Ebert	9.67	.8

[a] Estimated.
[b] 15 second-feet of this is estimated flow through circular culvert.
[c] 25 second-feet of this is estimated flow in third channel.

Daily discharge, in second-feet, of San Dieguito River at Bernardo, Cal., for the year ending Sept. 30, 1915.

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.
1	....	286	318	68	860	65	5	....
2	....	1,060	520	67	905	65	4	....
3	....	915	336	57	770	60	4	....
4	....	352	267	47	650	60	3	....
5	....	334	234	60	1,250	55	3	....
6	....	226	230	50	690	50	2.5	....
7	....	197	198	46	482	50	1	....
8	....	183	180	35	398	45	1	....
9	....	183	165	27	366	45	.5	....
10	....	1,840	186	29	303	40	.5	....
11	....	2,380	220	29	272	35	.5	....
12	....	740	170	36	242	35	.4	....
13	....	399	148	29	213	30	.4	....
14	....	318	139	42	185	30	.3	....
15	....	241	120	56	185	25	.3	....
16	....	226	112	91	172	20	.2	....
17	....	211	104	72	172	20	.2	....
18	....	211	97	56	305	20	.2	....
19	....	197	100	42	207	15	.1	....
20	....	197	92	42	155	15	.1	....
21	....	399	68	42	145	15	....	....
22	0.1	211	70	710	140	14	....	....
23	.1	183	64	382	130	13	....	....
24	.1	183	58	334	120	12	....	....
25	.1	241	60	242	115	11	....	....
26	.1	271	54	199	110	10	....	....
27	.1	226	57	199	100	9	....	20
28	.1	183	48	199	95	8	....	5
29	1,080	....	126	303	85	7	....	1
30	1,660	....	100	570	75	6	....	.5
31	432	....	88	....	70	....	....	.2

Note.—River practically dry Oct. 1 to Jan. 21, July 21 to Aug. 26, and Sept. 1–30.

Monthly discharge of San Dieguito River at Bernardo, Cal., for the year ending Sept. 30, 1915.

Month.	Discharge in second-feet.			Run-off (total in acre-feet).	Accuracy.
	Maximum.	Minimum.	Mean.		
October	0.0	0.0	0.0	0	
November	.0	.0	.0	0	
December	.0	.0	.0	0	
January	1,660	.0	102	6,270	C.
February	2,380	183	450	25,000	C.
March	520	48	153	9,410	C.
April	710	27	139	8,270	C.
May	1,250	70	322	19,800	C.
June	65	6	29.5	1,760	D.
July	5	.0	.88	54	D.
August	20	.0	.86	53	D.
September	.0	.0	.0	0	
The year	2,380	.0	97.4	70,600	

BLACK CANYON CREEK NEAR MESA GRANDE, CAL.

Location.—In the NE. ¼ sec. 17, T. 12 S., R. 2 E., San Diego County, 1 mile above junction with Santa Ysabel Creek, and about 4 miles southwest of Mesa Grande.

Drainage area.—15.2 square miles measured on topographic maps.

Records available.—February 14, 1913, to September 30, 1915, when the station was discontinued. Discharge measurements only for the years ending September 30, 1913 and 1915.

Gage.—Inclined staff on left bank.

Discharge measurements.—Made by wading near gage.

Channel and control.—Solid rock and boulders.

Diversions.—None.

Regulation.—None.

Discharge measurements of Black Canyon Creek near Mesa Grande, Cal., during the year ending Sept. 30, 1915.

Date.	Made by—	Gage height.	Discharge.	Date.	Made by—	Gage height.	Discharge.
		Feet.	*Sec.-ft.*			*Feet.*	*Sec.-ft.*
Jan. 18	D. A. McClung	0.37	0.6	June 29	W. J. Isbell	0.70	2.9
25	do	.80	4.8	July 13	do	.56	1.4
Feb. 22	R. W. Day	1.30	24	20	do	.50	.9
Mar. 1	do	1.72	46	27	do	.45	.6
8	do	1.25	25	Aug. 3	do	.40	.6
22	do	.95	8.9	10	do	.25	.1
29	do	1.00	11	17	do	.29	.2
Apr. 5	do	.85	6.6	24	do	.27	.1
12	do	.80	4.8	31	do	.28	.2
19	do	.79	4.1	Sept. 8	do	.30	.1
May 11	W. J. Isbell	1.44	33	14	do	.33	.4
25	do	1.15	15	21	do	.29	.4
June 1	do	.99	11	28	do	.29	.3

TEMESCAL CREEK NEAR ALMOND, CAL.

Location.—In the NW. ¼ sec. 23, T. 12 S., R. 1 E., San Diego County, about 400 feet above junction with Santa Ysabel Creek, and 1½ miles south of Almond.

Drainage area.—31.5 square miles (measured on topographic maps).

Records available.—February 15, 1913, to September 30, 1915, when station was discontinued. (Discharge measurements only for year 1912–13.)

Gage.—Inclined staff on right bank; read about twice a week by an employee of Volcan Land & Water Co.

Discharge measurements.—Made by wading near gage.

Channel and control.—Shifting sand.

Extremes of discharge.—Record too incomplete to show maximum stage during year or period; maximum mean daily discharge for year, estimated 125 second-feet February 11; minimum discharge estimated at 0.1 second-foot in October, November, and August.

Maximum mean daily discharge for period estimated at 300 second-feet February 21, 1914; practically no flow for several months each year.

Diversions.—None.

Regulation.—None.

Accuracy.—Discharge for periods in which gage was not read estimated by interpolation between current-meter measurements and by comparison with the record of flow of Santa Ysabel Creek near Ramona. Results poor.

Discharge measurements of Temescal Creek near Almond, Cal., during the year ending Sept. 30, 1915.

Date.	Made by—	Gage height.	Discharge.
		Feet.	*Sec.-ft.*
Jan. 10	D. A. McClung	1.09	0.6
17	.....do	1.07	.6
24	.....do	1.05	.9
Feb. 6	.....do	1.82	8.6
13	.....do	2.48	36
20	R. W. Day	2.01	20
27	.....do	1.90	16
Mar. 6	.....do	1.57	23
12	.....do	1.39	14
Mar. 20	R. W. Day	1.25	12
Apr. 2	.....do	.94	6.9
17	.....do	.71	4.5
17	.....do	.71	4.4
June 1	W. J. Isbell	.68	8.8
July 13	.....do	—.14	1.5
Aug. 10	.....do	—.37	.1
21	.....do	—.31	.8
Sept. 28	.....do	—.36	.4

Daily discharge, in second-feet, of Temescal Creek near Almond, Cal., for the year ending Sept. 30, 1915.

Day.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.
1	0.1	0.1	0.4	0.5	8	30	7	52	9	3.5	0.8	0.3
2	.1	.1	.5	.5	20	40	7	65	10	3.5	.8	.3
3	.1	.1	.5	.5	15	24	7	57	10	3	.7	.3
4	.1	.1	.5	.5	12	24	7	40	9	3	.7	.3
5	.1	.1	.5	.6	10	23	7	33	9	3	.6	.3
6	.1	.1	.5	.6	8.5	23	8	30	8	3	.5	.3
7	.1	.1	.5	.6	7.5	20	7	27	8	2.5	.4	.3
8	.1	.1	.5	.6	7	18	6	25	8	2.5	.3	.3
9	.1	2.0	.5	.6	7	16	6	24	7	2.5	.2	.3
10	.1	1.0	.5	.6	75	18	5	23	6	2	.1	.3
11	.1	.7	.5	.6	125	15	5	22	6	2	.1	.3
12	.1	.4	.5	.6	50	14	5	22	6	2	.1	.3
13	.1	.1	.5	.6	36	13	5	22	5	1.5	.1	.3
14	.1	.2	.5	.6	25	12	5	21	5	1.5	.1	.3
15	.2	.4	.5	.6	18	12	5	21	5	1.5	.1	.3
16	.2	.6	.5	.6	18	11	5	20	5	1.5	.1	.4
17	.2	.8	.8	.6	19	11	4.5	20	4	1	.1	.4
18	.1	1.0	1.0	.6	14	11	4	19	4	1	.1	.4
19	.1	.8	1.0	.6	12	12	4	18	4	1	.1	.4
20	.1	.7	1.0	.6	20	12	4	18	4	1	.1	.4
21	.1	.6	1.0	.7	20	12	10	18	4	1	.1	.4
22	.1	.5	1.0	2.5	15	12	15	18	4	1	.1	.4
23	.1	.4	1.0	1.5	14	11	10	17	4	1	.1	.4
24	.1	.3	1.0	.9	16	11	10	17	4	.9	.8	.4
25	.1	.2	1.0	2.0	25	11	8	16	3.5	.8	.8	.4
26	.1	.2	1.0	1.5	17	12	7	15	3.5	.8	15	.4
27	.1	.2	1.0	1.5	16	12	7	14	3.5	.8	1	.4
28	.1	.3	.9	2.0	13	11	7	13	3.5	.8	.5	.4
29	.1	.3	.8	75	....	10	12	12	3.5	.8	.5	.4
30	.1	.4	.7	40	....	9	40	11	3.5	.8	.4	.4
31	.1	....	.6	12	....	8	....	11	....	.8	.4	....

Monthly discharge of Temescal Creek near Almond, Cal., for the year ending Sept. 30, 1915.

Month.	Discharge in second-feet.			Run-off (total in acre-feet).	Accuracy.
	Maximum.	Minimum.	Mean.		
October	0.2	0.1	0.11	7	
November	2.0	.1	.43	26	
December	1.0	.4	.70	43	
January	75	.5	4.88	300	D.
February	125	7	23.0	1,280	D.
March	40	8	15.4	947	D.
April	40	4	7.98	475	D.
May	65	11	23.9	1,470	D.
June	10	3.5	5.63	335	D.
July	3.5	.8	1.68	103	D.
August	15	.1	.83	51	D.
September	.4	.3	.35	21	
The year	125	.1	6.98	5,060	

GUEJITO CREEK NEAR ESCONDIDO, CAL.

Location.—In northwest corner sec. 35, T. 12 S., R. 1 W., San Diego County, at highway bridge on road through San Pasqual Valley from Escondido to Ramona, one-fourth mile above junction with Santa Ysabel Creek, and about 7 miles southeast of Escondido.

Drainage area.—27.6 square miles (measured on topographic maps).

Records available.—February 8 to September 30, 1915, when station was discontinued.

Gage.—Vertical staff fastened to willow tree on right bank 15 feet above bridge; read once a day by J. E. Dailey.

Discharge measurements.—Made from bridge or by wading.

Channel and control.—Composed of sand; very shifting. At high stages water overflows the highway at several points as channel at bridge is inadequate.

Extremes of discharge.—Maximum mean daily discharge during year, estimated 118 second-feet February 10; no flow for several months during year.

Diversions.—A small ditch diverts water for irrigation above station.

Regulation.—None.

Accuracy.—Discharge determined by indirect method for shifting control and from poorly defined rating curves covering short periods. Results poor.

Discharge measurements of Guejito Creek near Escondido, Cal., during the year ending Sept. 30, 1915.

Date.	Made by—	Gage height.	Discharge.	Date.	Made by—	Gage height.	Discharge.
		Feet.	*Sec.-ft.*			*Feet.*	*Sec.-ft.*
Feb. 1	K. B. Sleppy		3.5	Mar. 11	D. L. Lee	2.8	13
7	do	1.79	5.1	27	F. C. Ebert	2.53	[c] 1
10	F. C. Ebert	2.52	90	May 4	D. L. Lee	2.88	28
25	D. L. Lee	2.68	[a] 42	17	F. C. Ebert	2.77	9.2
Mar. 3	F. C. Ebert	2.86	[b] 23				

[a] 4 second-feet of total is estimated flow in second channel.

[b] 3 second-feet of total is estimated flow in second channel.

[c] Estimated.

Daily discharge, in second-feet, of Guejito Creek near Escondido, Cal., for the year ending Sept. 30, 1915.

Day.	Feb.	Mar.	Apr.	May.	June.	Day.	Feb.	Mar.	Apr.	May.	June.
1	......	24	1	34	5	16	62	11	.5	8	2.5
2	......	35	1	34	5	17	57	10	.5	7	2.5
3	......	23	1	34	5	18	54	10	.5	10	1
4	......	19	1	29	5	19	45	10	.5	7	1
5	......	18	1	56	5	20	42	9	.5	7	1
6	......	22	1	40	5	21	34	9	.5	7	1
7	......	13	1	32	5	22	36	8	29	7	1
8	5	16	.5	25	2.5	23	29	8	29	5	1
9	5	15	.5	23	2.5	24	40	5	24	5	1
10	118	18	.5	22	2.5	25	43	4.5	20	5	.5
11	92	13	.5	21	2.5	26	26	2.5	20	5	.5
12	71	17	.5	15	2.5	27	28	1	12	5	.5
13	81	12	.5	14	2.5	28	28	1	12	5	.5
14	69	12	.5	13	2.5	29	......	1	16	5	.5
15	72	11	.5	9	2.5	30	......	1	24	5	.5
						31	......	1	......	5	......

NOTE.—No flow July to September.

Monthly discharge of Guejito Creek near Escondido, Cal., for the year ending Sept. 30, 1915.

Month.	Discharge in second-feet.			Run-off (total in acre-feet).	Accuracy.
	Maximum.	Minimum.	Mean.		
February 8-28	118	5	49.4	2,060	D.
March	35	1	11.6	713	D.
April	29	.5	6.67	397	D.
May	56	5	16.1	990	D.
June	5	.5	2.33	139	D.
July	.0	.0	.0	0	
August	.0	.0	.0	0	
September	.0	.0	.0	0	
The period	....	....	....	4,300	

WEST SAN PASQUAL DITCH NEAR ESCONDIDO, CAL.

Location.—In sec. 34, T. 12 S., R. 1 W., San Diego County, at upper end of San Pasqual Valley, 800 feet below intake on Santa Ysabel Creek, about 7 miles southeast of Escondido.

Records available.—1912 to September 30, 1915, when station was discontinued.

Gage.—Vertical staff fastened to side of old culvert about 800 feet below head gate; read daily by J. E. Dailey.

Discharge measurements.—Made from foot plank across ditch near gage.

Channel and control.—Considerable silt from the Santa Ysabel is deposited in the ditch and causes changes in the stage-discharge relation.

Extremes of discharge.—Maximum discharge 1912-1915, 16 second-feet, February 24, 1914. No flow for several months each year.

Accuracy.—Sufficient discharge measurements were not made to determine accurately changes in stage-discharge relation; gage-height record considered only fair. Results poor.

The intake of West San Pasqual ditch is below that of the East San Pasqual and on the opposite side of the Santa Ysabel. From January 16 to August 14, if there is not sufficient water in the stream for both ditches, the West San Pasqual may take 16 second-feet for 20 consecutive days out of each 30. This water is used for irrigation in San Pasqual Valley.

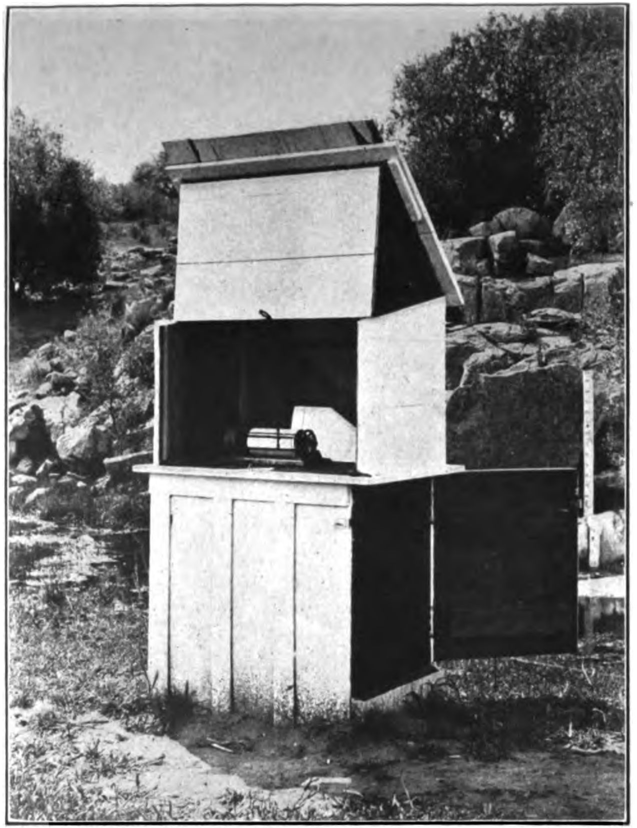
Discharge measurements of West San Pasqual ditch near Escondido, Cal., during the year ending Sept. 30, 1915.

Date.	Made by—	Gage height.	Discharge.	Date.	Made by—	Gage height.	Discharge.
		Feet.	*Sec.-ft.*			*Feet.*	*Sec.-ft.*
Jan. 25	F. C. Ebert	1.93	5.3	Apr. 10	R. W. Day	2.11	5.8
Feb. 7	K. B. Sleppy	2.01	6.5	July 7	F. C. Ebert	2.27	5.5
Mar. 3	F. C. Ebert	....	.0	Aug. 2	.....do	....	.0
27	.....do	2.29	7.2				

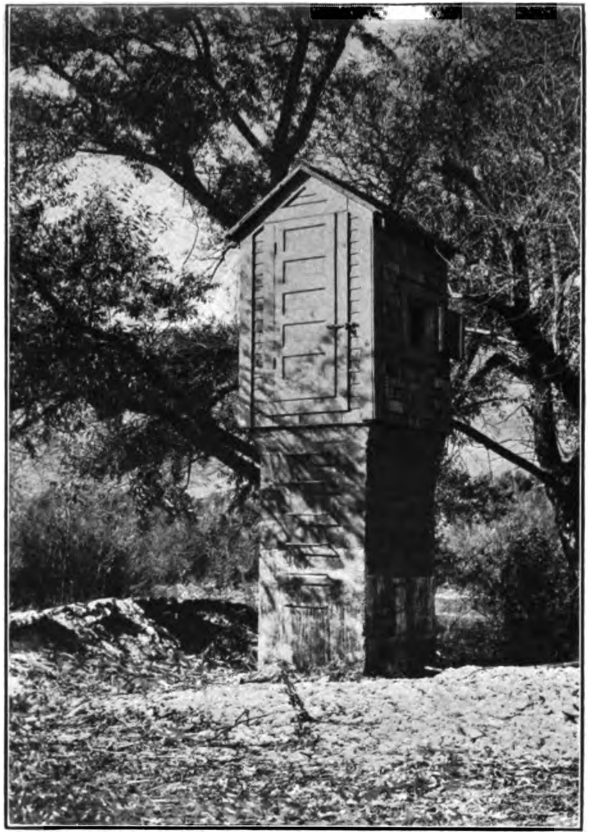
Daily discharge, in second-feet, of West San Pasqual ditch near Escondido, Cal., for the year ending Sept. 30, 1915.

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.
1	....	0	0	10	0	3.5	5
2	....	0	0	9	0	2	3.5
3	....	0	0	5.5	0	3.5	3.5
4	....	0	0	5.5	0	3.5	3.5
5	....	7.5	0	5	0	3.5	3.5
6	....	7	0	9	0	3.5	3
7	....	6.5	0	5.5	0	3.5	5
8	....	7	0	6.5	0	3.5	3.5
9	....	6.5	0	5.5	0	3.5	7
10	....	6.5	0	5.5	0	3	5
11	....	0	0	5.5	0	3.5	6
12	....	0	0	5.5	0	3.5	6
13	....	0	0	5.5	0	3.5	5
14	....	0	0	4.5	0	3.5	7
15	....	0	0	4.5	0	3.5	8
16	....	0	0	6.5	0	3.5	8
17	....	6.5	0	4.5	0	5	5
18	....	9	0	4.5	5	5	6
19	....	6.5	0	4.5	3.5	6	6
20	....	6.5	0	5.5	6	5	7
21	....	0	0	0	3.5	5	6
22	....	0	0	0	3.5	3.5	8
23	....	0	0	5.5	0	3.5	8
24	....	0	0	0	0	3.5	8
25	6.5	0	5.5	0	0	3.5	8
26	6.5	0	5	0	0	6	8
27	6.5	0	6	0	5	3.5	8
28	6.5	0	7	0	3.5	3.5	8
29	0	....	7	0	6	3.5	6
30	0	....	5	0	6	3.5	7
31	0	....	5	....	6	....	0

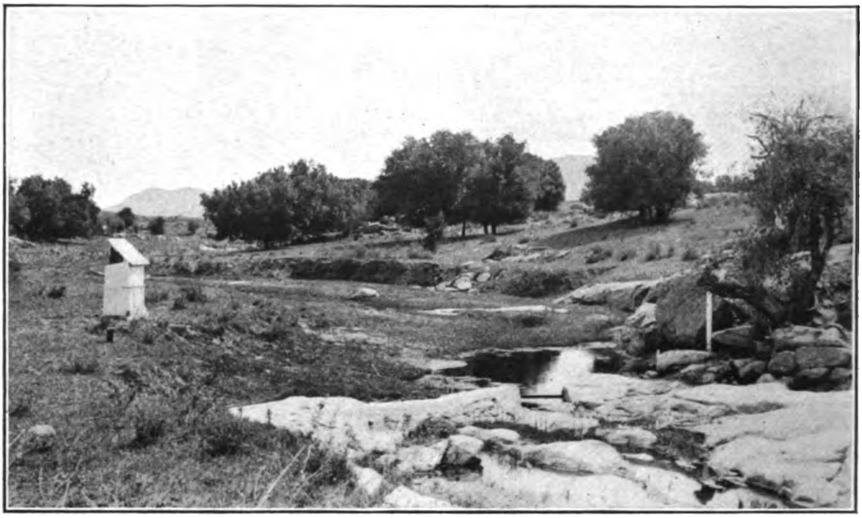
NOTE.—Discharge determined from five poorly defined rating curves applicable for short periods, and by indirect method for shifting control from Mar. 28 to Apr. 9. Ditch dry Oct. 1 to Jan. 24 and July 31 to Sept. 30.



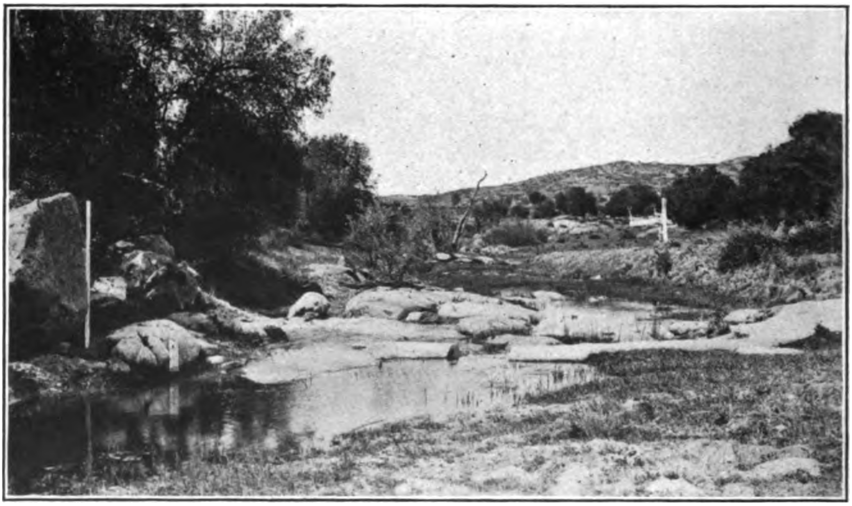
A. WATER-STAGE RECORDER IN WOODEN WELL AND BOX SHELTER ON SANTA MARIA CREEK NEAR RAMONA, CAL.



B. REINFORCED CONCRETE WELL AND WOODEN GAGE HOUSE ON SAN JOAQUIN RIVER AT FRIANT, CAL.



A. UPSTREAM VIEW, SHOWING CONCRETE CONTROL AND STAFF AND RECORDING GAGES.



B. DOWNSTREAM VIEW, SHOWING CONTROL, GAGES, AND CAR AND CABLE.

SANTA MARIA CREEK NEAR RAMONA, CAL.

Monthly discharge of West San Pasqual ditch near Escondido, Cal., for the year ending Sept. 30, 1915.

Month.	Discharge in second-feet.			Run-off (total in acre-feet).	Accuracy.
	Maximum.	Minimum.	Mean.		
October	0.0	0.0	0.0	0	
November	.0	.0	.0	0	
December	.0	.0	.0	0	
January	6.5	.0	.84	52	D.
February	9	.0	2.48	138	D.
March	7	.0	1.31	81	D.
April	10	.0	4.12	245	D.
May	6	.0	1.55	95	D.
June	6	2	3.80	226	D.
July	8	.0	5.85	360	D.
August	.0	.0	.0	0	
September	.0	.0	.0	0	
The year	10	.0	1.65	1,200	

SANTA MARIA CREEK NEAR RAMONA, CAL.

Location.—In the SE. ¼ SE. ¼ sec. 11, T. 13 S., R. 1 W., San Diego County, 5½ miles west of Ramona, and about 7 miles below mouth of Hatfield Creek.

Drainage area.—57.3 square miles (measured on topographic maps).

Records available.—November 6, 1912, to September 30, 1915.

Gage.—Friez water-stage recorder on right bank (Pl. IV, *A*) with staff in two sections on opposite bank just above control (Pl. V).

Discharge measurements.—Made from cable (Pl. V) 100 feet below gage or by wading.

Channel and control.—Channel above and below station shifting sand. Left bank is high; right bank subject to overflow during extremely high water. Concrete control (Pl. V) installed just below gage at outcrop of solid rock. Zero flow, about stage 1.32 feet.

Extremes of discharge.—Maximum stage during year and period 1912-1915, from water-stage recorder, 7.05 feet at midnight February 10, 1915 (discharge, computed from extension of rating curve, about 1,890 second-feet). No flow for several months each year.

Diversions.—None.

Regulation.—None.

Accuracy.—Results good. Rating curve well defined except for extremely high stages.

Discharge measurements of Santa Maria Creek near Ramona, Cal., during the year ending Sept. 30, 1915.

Date.	Made by—	Gage height.	Discharge.	Date.	Made by—	Gage height.	Discharge.
		Feet.	*Sec.-ft.*			*Feet.*	*Sec.-ft.*
Jan. 31	D. A. McClung	2.46	36	Mar. 30	R. W. Day	2.02	8.7
Feb. 5	.....do	2.25	17	Apr. 6	.....do	1.86	2.5
16	R. W. Day	2.43	31	13	.....do	1.53	.5
23	.....do	2.32	21	20	.....do	1.63	1.3
Mar. 2	.....do	2.91	113	May 6	.....do	2.59	47
8	F. C. Ebert	2.32	25	11	W. J. Isbell	2.26	18
9	R. W. Day	2.26	19	June 1	.....do	1.85	3.6
16	.....do	2.12	12	9	.....do	1.60	1.1
23	.....do	1.99	7				

Daily discharge, in second-feet, of Santa Maria Creek near Ramona, Cal., for the year ending Sept. 30, 1915.

Day.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.
1	....	0.1	0.1	35	124	6.4	192	4.3	0.2
2	....	.1	.1	420	150	4.3	163	4.3	.2
3	0.1	.1	.1	124	41	3.4	71	5.2	.2
4	.1	.2	.1	29	35	3.4	29	4.3	.2
5	.1	.2	.1	18	29	3.4	112	3.4	.2
6	.1	.2	.1	15	29	4.3	63	3.4	.2
7	.1	.2	.1	13	25	4.3	41	2.0	.2
8	.1	.1	.1	9.2	21	2.7	25	1.5	.2
9	.1	.2	.1	11	18	2.7	18	1.0	.1
10	.1	.2	.1	382	48	2.0	18	.8	.1
11	.1	.4	.1	450	63	2.0	18	.8	.1
12	.1	.1	.1	110	18	2.0	15	.5	.1
13	.1	.1	.1	60	15	.8	13	.4	.1
14	.1	.1	.1	40	13	2.0	11	.2	.1
15	.1	.1	.1	30	15	4.3	11	.2	.1
16	.1	.2	.1	35	11	6.4	11	.2	.1
17	.1	.1	.1	41	11	2.7	11	.2	.1
18	.1	.1	.1	25	9.2	2.0	18	.2	.1
19	.1	.1	.1	29	9.2	2.0	15	.2	....
20	.1	.1	.1	101	9.2	1.5	13	.2	....
21	.1	.1	.1	63	9.2	18	11	.2	....
22	.1	.1	.2	35	5.2	41	11	.2	....
23	.1	.1	.1	29	6.4	15	11	.2	....
24	.1	.1	.1	48	9.2	25	11	.2	....
25	.1	.1	.1	136	5.2	11	9.2	.1	....
26	.1	.1	.1	35	5.2	9.2	9.2	.1	....
27	.1	.1	.1	29	6.4	4.3	6.4	.2	....
28	.1	.1	1.0	29	7.6	13	6.4	.2	....
29	.1	.1	860	....	9.2	19	6.4	.2	....
30	.1	.1	458	....	7.6	101	5.2	.2	....
31	....	.1	41	....	6.4	....	5.2	....	....

NOTE.—No flow Oct. 1 to Nov. 2 and July 19 to Sept. 30. Discharge estimated Dec. 30 to Jan. 4, Feb. 11–15, June 24, 26, and 27.

Monthly discharge of Santa Maria Creek near Ramona, Cal., for the year ending Sept. 30, 1915.

Month.	Discharge in second-feet.			Run-off (total in acre-feet).	Accuracy.
	Maximum.	Minimum.	Mean.		
October	0.0	0.0	0.0	0	
November	.1	.0	.09	5	
December	.4	.1	.13	8	
January	860	.1	44.0	2,700	C.
February	450	9.2	85.0	4,720	C.
March	150	5.2	24.9	1,530	B.
April	101	.8	10.6	631	B.
May	192	5.2	31.0	1,910	B.
June	5.2	.1	1.17	70	C.
July	.2	.0	.08	5	
August	.0	.0	.0	0	
September	.0	.0	.0	0	
The year	860	.0	15.9	11,600	

SAN LUIS REY RIVER BASIN.

SAN LUIS REY RIVER[1] NEAR WARNER SPRINGS, CAL.

Location.—In the NE. ¼ sec. 17, T. 10 S, R. 3 E., in San Jose del Valle grant, San Diego County, about 3½ miles above junction with West Fork of San Luis Rey River, and 4 miles northwest of Warner Springs.

Drainage area.—35.8 square miles (measured on topographic maps).

Records available.—January 25, 1913, to September 30, 1915, when station was discontinued.

Gage.—Sanders & Rising water-stage recorder on left bank with staff in two sections on opposite bank.

Discharge measurements.—Made by wading near gage.

Channel and control.—Channel in shifting sand. A concrete control has been built across the channel just below gage, but it is not very effective on account of the accumulation of sand.

Extremes of discharge.—Maximum stage during year not known, as water-stage recorder was not in operation during flood period. Maximum mean daily discharge during year (estimated at 185 second-feet), February 11; minimum stage occurred October 1 to 5, when water-stage recorder was not in operation (mean daily discharge estimated at 0.7 second-foot).

1913–1915: Maximum stage recorded, about 4.0 feet at crest of flood of January 27, 1914 (discharge, 233 second-feet); minimum stage recorded, 2.2 feet August 23 to 25, 1914 (discharge, 0.4 second-foot).

Diversions.—None.

Regulations.—None.

Accuracy.—Daily discharge determined by interpolation between measurements, from rating curves covering short periods, and by comparison with records of flow of San Luis Rey River near Mesa Grande. No gage-height record January 28 to 31 and February 10 and 11; discharge estimated as 12 per cent of the flow of San Luis Rey River near Mesa Grande. Results fair.

Discharge measurements of San Luis Rey River near Warner Springs, Cal., during the year ending Sept. 30, 1915.

Date.	Made by—	Gage height.	Discharge.	Date.	Made by—	Gage height.	Discharge.
		Feet.	*Sec.-ft.*			*Feet.*	*Sec.-ft.*
Oct. 20	W. J. Isbell	2.18	1.0	May 27	W. J. Isbell	2.47	3.2
Nov. 20	.....do	2.17	.8	June 8	.....do	2.36	1.3
Dec. 9	.....do	2.16	1.2	10	.....do	2.32	1.6
Jan. 27	.....do	2.17	.8	24	.....do	2.32	1.4
Feb. 1	.....do	2.80	33	July 1	.....do	2.30	1.2
3	.....do	3.10	51	8	.....do	2.32	1.5
12	.....do	3.30	80	15	.....do	2.31	1.1
18	.....do	2.81	15	22	.....do	2.31	1.2
Mar. 4	.....do	2.80	32	29	.....do	2.30	1.1
11	.....do	2.72	19	Aug. 5	.....do	2.28	1.1
18	.....do	2.57	6.0	12	.....do	2.29	1.1
25	.....do	2.44	3.7	19	.....do	2.28	1.0
Apr. 8	.....do	2.32	1.8	26	.....do	2.28	1.1
16	.....do	2.28	1.8	Sept. 9	.....do	2.27	1.0
23	.....do	2.58	9.2	16	.....do	2.28	1.4
May 7	.....do	2.80	35	23	.....do	2.27	1.2
13	R. W. Day	2.66	11	30	.....do	2.28	1.2
20	W. J. Isbell	2.58	7.6				

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[1] Local name Puerta la Cruz Creek.

Daily discharge, in second-feet, of San Luis Rey River near Warner Springs, Cal., for the year ending Sept. 30, 1915.

Day.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.
1	0.7	0.9	1.0	1.2	33	23	3	42	2.0	1.2	1.1	1.1
2	.7	.9	1.1	1.2	126	39	3	38	1.3	1.2	1.1	1.1
3	.7	.9	1.1	1.2	51	46	3	20	1.3	1.3	1.1	1.0
4	.7	.9	1.1	1.2	14	32	2	16	1.3	1.3	1.1	1.0
5	.7	.9	1.1	1.2	8.5	30	2	62	1.4	1.4	1.1	1.0
6	.8	.9	1.2	1.2	3.5	28	1.8	45	1.4	1.4	1.1	1.0
7	.8	.9	1.2	1.2	2.0	26	1.8	40	1.5	1.5	1.1	1.0
8	.8	.9	1.2	1.2	2.0	24	1.8	43	1.5	1.5	1.1	1.0
9	.8	.9	1.2	1.2	3.5	22	1.8	46	1.6	1.5	1.1	1.0
10	.8	.9	1.2	1.2	175	20	1.8	28	1.6	1.4	1.1	1.0
11	.8	.8	1.2	1.2	185	19	1.8	26	1.6	1.3	1.1	1.1
12	.9	.8	1.2	1.2	80	17	1.8	16	1.6	1.3	1.1	1.2
13	.9	.8	1.2	.9	69	15	1.8	11	1.6	1.2	1.1	1.2
14	.9	.8	1.2	.9	54	13	1.8	11	1.5	1.1	1.1	1.3
15	.9	.8	1.2	.9	46	11	1.8	11	1.5	1.1	1.1	1.4
16	.9	.8	1.2	.9	38	9	1.8	14	1.5	1.1	1.0	1.4
17	.9	.8	1.2	.9	32	8	1.8	14	1.5	1.1	1.0	1.4
18	1.0	.8	1.2	.9	15	6	1.8	11	1.5	1.1	1.0	1.3
19	1.0	.8	1.2	.9	15	5.5	1.8	11	1.5	1.2	1.0	1.3
20	1.0	.8	1.2	.9	24	5.5	3.5	8	1.5	1.2	1.0	1.3
21	1.0	.8	1.2	.9	20	5	33	6	1.4	1.2	1.0	1.3
22	1.0	.8	1.2	8.0	18	4.5	16	6	1.4	1.2	1.0	1.2
23	1.0	.8	1.2	1.0	15	4.5	10	6	1.4	1.2	1.1	1.2
24	1.0	.9	1.2	2.0	16	4	6	6	1.4	1.2	1.1	1.2
25	1.0	.9	1.2	5.0	18	3.5	6	4	1.4	1.2	1.1	1.2
26	1.0	.9	1.2	2.0	15	3.5	5	4	1.4	1.1	1.1	1.2
27	1.0	.9	1.2	.8	13	3.5	3.5	3	1.3	1.1	1.1	1.2
28	1.0	1.0	1.2	19	11	3.5	5	2	1.3	1.1	1.1	1.2
29	1.0	1.0	1.2	175	....	3.5	10	2	1.2	1.1	1.1	1.2
30	1.0	1.0	1.2	96	....	3.5	20	2	1.2	1.1	1.1	1.2
31	1.0	....	1.2	33	....	3.5	....	2	....	1.1	1.1	....

Monthly discharge of San Luis Rey River near Warner Springs, Cal., for the year ending Sept. 30, 1915.

Month.	Discharge in second-feet.			Run-off (total in acre-feet).	Accuracy.
	Maximum.	Minimum.	Mean.		
October	1.0	0.7	0.89	55	D.
November	1.0	.8	.87	52	D.
December	1.2	1.0	1.18	73	C.
January	175	.8	11.8	726	D.
February	185	2.0	39.4	2,190	C.
March	46	3.5	14.2	873	C.
April	33	1.8	5.21	310	C.
May	62	2.0	17.9	1,100	C.
June	2.0	1.2	1.45	86	C.
July	1.5	1.1	1.23	76	C.
August	1.1	1.0	1.08	66	D.
September	1.4	1.0	1.17	70	D.
The year	185	.7	7.85	5,680	

SAN LUIS REY RIVER NEAR MESA GRANDE, CAL.

Location.—In the NE, ¼ sec. 9, T. 11 S., R. 2 E., San Diego County, at concrete weir 1 mile below Warner dam site, 1 mile below mouth of Carrizo Creek, and about 5 miles north of Mesa Grande.

Drainage area.—209 square miles (measured on topographic maps).

Records available.—October 1, 1911, to September 30, 1915.

Gage.—Barrett & Lawrence water-stage recorder on left bank just above weir, March 18, 1915, a vertical staff was installed at weir for use during low water; datum same as that of water-stage recorder. Previous to June 13, 1912, gage was just above cut-off wall at dam site. Original datum has not been maintained.

Discharge measurements.—Made from cable about 1 mile above gage or by wading.

Channel and control.—Channel composed of sand and gravel; somewhat shifting. Concrete weir (Pl. III, *B*, p. 48) acts as control for gage.

Extremes of discharge.—Maximum stage during year, from water-stage recorder, 7.15 feet at 4 a. m. February 11 (discharge, 3,240 second-feet); minimum stage from water-stage recorder, 0.15 foot October 1 (discharge estimated, 0.7 second-foot).

1911–1915: Maximum stage recorded, 7.5 feet February 21, 1914 (discharge, 3,470 second-feet); minimum stage recorded, 0.09 foot August 31, 1914 (discharge, estimated 0.2 second-foot).

Diversions.—None.

Regulation.—None.

Accuracy.—At low stages sand collects at the weir and causes slight changes in the stage-discharge relation; extent of changes are determined by frequent discharge measurements. Results good.

Discharge measurements of San Luis Rey River near Mesa Grande, Cal., during the year ending Sept. 30, 1915.

Date.	Made by—	Gage height.	Discharge.	Date.	Made by—	Gage height.	Discharge.
		Feet.	*Sec.-ft.*			*Feet.*	*Sec.-ft.*
Oct. 12	F. C. Ebert	0.20	1.5	Mar. 24	W. J. Isbell	0.74	68
24	W. J. Isbell	.21	1.1	31	.....do	.71	64
Nov. 16	.....do	.20	1.5	Apr. 9	.....do	.59	43
24	.....do	.21	1.3	28	.....do	.79	71
Dec. 7	.....do	.24	2.1	May 12	.....do	1.38	190
12	.....do	42	11	26	.....do	.78	81
19	.....do	.40	11	June 8	.....do	.61	49
Jan. 9	.....do	.39	10	30	.....do	.35	16
16	.....do	.27	4.2	July 10	.....do	.34	10
22	.....do	1.22	135	13	F. C. Ebert	.32	7.6
25	.....do	.82	54	22	W. J. Isbell	.26	3.9
29	.....do	3.12	816	27	.....do	.28	3.5
29	.....do	5.60	2,440	Aug. 4	.....do	.21	2.0
Feb. 2	.....do	5.40	2,030	9	.....do	.19	1.4
8	.....do	.75	61	16	.....do	.16	1.5
10	.....do	3.38	1,170	23	.....do	.17	1.5
11	.....do	4.18	1,420	28	.....do	.14	1.7
16	.....do	1.49	227	Sept. 11	.....do	.15	1.3
Mar. 7	F. C. Ebert	1.33	186	15	.....do	.17	1.7
15	W. J. Isbell	1.04	119	17	.....do	.16	1.2

Daily discharge, in second-feet, of San Luis Rey River near Mesa Grande, Cal., for the year ending Sept. 30, 1915.

Day.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.
1	0.7	1.2	2.3	4.1	147	402	54	552	60	15	2.5	1.5
2	.8	1.2	2.6	3.4	1,050	492	50	605	60	15	2.5	1.5
3	.8	1.2	2.6	4.1	500	364	47	582	60	14	2	1.5
4	.8	1.2	2.6	6.0	169	303	47	605	59	13	2	1.5
5	.9	1.2	2.6	4.4	156	274	48	925	59	13	2	1.5
6	1.0	1.2	2.6	4.8	147	231	52	618	54	12	2	1.5
7	1.0	1.6	3.4	4.4	147	202	48	435	50	11	1.5	1.5
8	1.1	1.2	2.6	5.4	92	164	48	341	46	11	1.5	1.5
9	1.2	1.2	1.2	10	422	162	47	282	45	10	1.5	1.5
10	1.2	1.2	2.6	7.9	1,460	223	47	273	44	10	1.5	1.5
11	1.2	1.2	4.8	6.7	1,540	179	46	273	43	9	1.5	1.5
12	1.2	1.2	12	5.4	685	172	47	195	42	8	1.5	1.5
13	1.2	1.2	9.1	5.4	452	145	46	159	41	7.5	1.5	1.5
14	1.2	1.2	4.8	6.0	321	142	48	145	39	7	1.5	1.5
15	1.2	1.2	7.3	5.4	279	131	54	131	38	7	1.5	1.5
16	1.2	1.2	7.9	5.4	210	120	52	116	36	7	1.5	1.5
17	1.2	1.2	18	4.8	192	100	44	145	35	6	1.5	1.5
18	1.2	1.2	15	5.4	149	93	43	162	33	6	1.5	1.5
19	1.2	1.2	9.8	5.4	145	90	43	141	32	5	1.5	1.5
20	1.2	1.2	6.7	5.4	368	84	37	132	30	5	1.5	1.5
21	1.2	1.2	7.9	7.9	349	76	204	137	29	4	1.5	1.5
22	1.2	1.2	6.0	65	274	73	271	132	27	4	1.5	1.5
23	1.2	1.2	4.8	12	245	71	114	128	26	4	1.5	1.5
24	1.6	1.6	4.8	16	271	71	85	107	24	4	1.5	1.5
25	1.2	1.6	4.1	45	412	71	65	95	23	3.5	1.5	1.5
26	1.2	1.6	4.1	16	197	69	79	84	21	3.5	1.5	1.5
27	1.2	1.6	4.1	5.4	142	71	72	80	20	3.5	1.5	1.5
28	1.2	1.6	4.1	156	140	67	76	75	18	3.5	1.5	1.5
29	1.2	1.6	4.4	1,460	....	95	106	69	17	3.5	1.5	1.5
30	1.2	1.6	3.7	800	....	71	334	64	16	3	1.5	1.5
31	1.2	....	3.7	303	....	66	....	54	....	3	1.5	....

NOTE.—Discharge determined from seven fairly well defined rating curves, applicable for short periods; discharge June 9 to Sept. 30 interpolated between measurements.

Monthly discharge of San Luis Rey River near Mesa Grande, Cal., for the year ending Sept. 30, 1915.

Month.	Discharge in second-feet.			Run-off (total in acre-feet).	Accuracy.
	Maximum.	Minimum.	Mean.		
October	1.6	0.7	1.13	69	D.
November	1.6	1.2	1.31	78	C.
December	18	1.2	5.55	341	B.
January	1,460	3.4	96.6	5,940	B.
February	1,540	92	381	21,200	B.
March	492	66	157	9,650	B.
April	334	37	78.5	4,670	B.
May	925	54	253	15,600	C.
June	60	16	37.6	2,240	C.
July	15	3	7.45	458	C.
August	2.5	1.5	1.63	100	D.
September	1.5	1.5	1.50	89	D.
The year	1,540	.7	83.4	60,400	

SAN LUIS REY RIVER NEAR NELLIE, CAL.

LOCATION.—In the SW. ¼ NW. ¼ sec. 33, T. 10 S., R. 1 E., a short distance above intake of Escondido Mutual Water Co.'s canal, about 3½ miles above Rincon Indian Reservation, 5 miles southwest of Nellie, San Diego County, and 15 miles northeast of Escondido.

DRAINAGE AREA.—240 square miles (measured on topographic maps).

Records available.—Discharge measurements only for the years ending September 30, 1899, 1912, 1914, and 1915; those previous to 1915 were published as miscellaneous measurements.

Discharge measurements.—Made by wading at various sections above intake to Escondido Mutual Water Co.'s canal.

Channel.—Shifting sand and boulders.

Diversions.—None.

Regulation.—None.

Discharge measurements of San Luis Rey River near Nellie, Cal., during the year ending Sept. 30, 1915.

Date.	Made by—	Gage height.	Discharge.	Date.	Made by—	Gage height.	Discharge.
		Feet.	*Sec.-ft.*			*Feet.*	*Sec.-ft.*
June 11	W. J. Isbell		57	Aug. 13	W. J. Isbell		5.4
25	.....do		35	20	.....do		5.1
July 2	.....do		23	27	.....do		5.6
9	.....do		[a] 19	Sept. 3	.....do		2.9
12	F. C. Ebert		14	10	.....do		3.2
24	W. J. Isbell		11	17	.....do		6.1
29	.....do		9.1	24	.....do		4.1
Aug. 7	.....do		5.9	27	Ebert and Dixon		[b] 4.5

[a] Made by combining a measurement at 200 feet below intake to canal with a measurement of flow in canal.

[b] Made by diverting total flow of river into canal and measuring it by the weir in canal.

SAN LUIS REY RIVER NEAR PALA, CAL.

Location.—In the NW. ¼ sec. 31, T. 9 S., R. 1 W., San Diego County, above ford on road to Sickler's mill, about 4 miles southeast of Pala.

Drainage area.—322 square miles (measured on topographic maps).

Records available.—October 9, 1903, to June 30, 1911. November 14, 1912, to September 30, 1915.

Gage.—Friez water-stage recorder on left bank 600 feet above ford and staff gage in three sections at same site. Previous to September 19, 1912, records were obtained from staff gage about 50 feet above ford. November 13, 1906, original gage datum was lowered 4.66 feet; new gage above cable is at independent datum.

Discharge measurements.—Made from cable 550 feet below water-stage recorder or by wading.

Channel and control.—Bed of river composed of sand, gravel, and boulders; shifting. An artificial control, consisting of short concrete cut-off walls between the boulders, was rebuilt across the channel just below the gage September 28, 1914. Zero flow for new control, about stage 5.7 feet.

Extremes of discharge.—Maximum stage during year, from water-stage recorder 12.4 feet at 3.30 a. m. February 11 (discharge determined from extension of rating curve, about 6,510 second-feet); minimum stage recorded, 5.92 feet October 1 and 12 (discharge, 3 second-feet).

1903–1915: Maximum stage recorded, 12.00 feet (original datum) at noon and at 2 p. m. March 24, 1906 (discharge determined from extension of rating curve, 22,000 second-feet); minimum stage recorded, 5.28 feet, August 6 and 7, 1907 (discharge, 0.6 second-foot). February 1 and 2, 1906, the stage was 0.1 foot (original gage datum) but the discharge was 10 second-feet.

Diversions.—Water is diverted for irrigation on the Rincon Indian Reservation. The Escondido Mutual Water Co. diverts water from San Luis Rey River about 10 miles above the station. This water, which is stored at the Escondido reservoir (capacity, 3,120 acre-feet), about 6 miles northeast of Escondido, is used for irrigation and municipal supply at Escondido and vicinity. Water is diverted from Pauma Creek for irrigation on the Pauma Reservation and Pauma Rancho. About 1 second-foot of water is diverted above station for irrigation of orchard at Sickler's mill on left bank below station.

Regulation.—None.

Accuracy.—Results considered good except for extremely high stages. The high-water extension of the rating curve was made from a study of the record on San Luis Rey near Mesa Grande and the high-water curve for 1910. A change in the rating between July 9 and 13 was probably due to accumulation of sand at control.

Discharge measurements of San Luis Rey River near Pala, Cal., during the year ending Sept. 30, 1915.

Date.	Made by—	Gage height.	Discharge.	Date.	Made by—	Gage height.	Discharge.
		Feet.	*Sec.-ft.*			*Feet.*	*Sec.-ft.*
Oct. 14	W. J. Isbell	5.94	3.4	Apr. 7	F. C. Ebert	6.58	95
23	.....do	5.97	4.0	27	W. J. Isbell	6.80	174
Nov. 6	.....do	5.96	3.8	May 6	W. D. McFadden	7.92	804
Dec. 22	F. C. Ebert	6.04	7.3	16	F. C. Ebert	7.07	285
Jan. 11	Lee and Sleppy	6.00	6.4	21	.....do	7.00	240
23	F. C. Ebert	6.30	38	July 9	W. J. Isbell	6.09	13
23	.....do	6.30	38	13	F. C. Ebert	6.01	12
Feb. 2	.....do	7.85	644	24	W. J. Isbell	5.97	6.2
13	.....do	7.82	648	Aug. 2	F. C. Ebert	5.97	7.2
27	.....do	7.08	276	Sept. 17	W. J. Isbell	5.96	6.5
Mar. 11	.....do	7.13	309	26	F. C. Ebert	5.97	7.1
26	.....do	6.70	116				

Daily discharge, in second-feet, of San Luis Rey River near Pala, Cal., for the year ending Sept. 30, 1915.

Day.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.
1	3	5	9.5	6.5	475	289	134	660	158	13	7	6.5
2	4	4.5	10	6.5	1,290	379	118	790	151	13	7	7
3	5	4.5	6	6.5	525	690	103	660	141	13	7	8
4	5	4.5	6	6.5	311	500	103	602	134	13	7	8
5	5	4.5	6	6.5	247	451	98	975	125	13	6.5	7
6	4.5	4.5	8	6.5	207	451	100	722	112	13	6.5	6
7	4	4.5	8	6	161	403	98	602	103	13	6.5	6
8	3.5	4.5	8.5	6	66	356	87	575	95	13	6	6
9	3.5	6	8.5	6	207	333	73	550	85	13	6.5	6
10	3	6	8.5	6	1,760	356	69	525	77	13	6.5	6
11	3	6	8.5	6	3,300	289	66	475	77	12	6.5	6
12	3	7.5	8.5	6	1,760	268	64	451	77	12	6.5	6
13	3	7.5	9	6	790	247	64	403	77	12	6.5	6
14	3.5	6	9	6	500	247	66	333	66	12	6.5	6.5
15	3.5	4.5	9	6	427	227	77	289	66	10	6.5	6.5
16	3.5	4.5	9	6	333	207	90	289	56	7	6	6.5
17	4	5	9.5	6	289	188	73	268	47	6	6.5	6.5
18	4	5	13	6	227	184	71	311	38	6	6.5	6.5
19	4	5	10	6	215	176	66	289	38	6	6.5	6.5
20	4.5	5	8	6	311	168	60	268	38	6.5	7	6.5
21	4.5	5	8	8	500	168	98	247	38	7	7	6.5
22	5	5	9	38	427	161	550	239	38	7	6	7
23	5	5	9	42	356	154	333	219	30	7	6.5	7
24	5	5	8	15	311	144	289	215	30	7	6.5	7
25	5	5	8	20	289	141	247	211	30	7	9	7
26	4.5	5.5	7.5	28	289	134	223	207	23	7	14	7
27	4.5	5.5	7.5	16	289	134	176	203	23	7	10	6.5
28	4.5	6	7.5	16	289	151	176	195	21	7	9	6
29	5	6	7.5	975	....	168	207	191	18	7	7	5.5
30	5	6	7.5	1560	....	151	356	180	15	7	5	5.5
31	5	....	7.5	660	....	134	....	168	....	7	6.5	....

Note.—Discharge determined as follows: Oct. 1 to July 8 and July 13 to Sept. 30, from two rating curves well defined below 1,000 second-feet; Dec. 7–12 and July 9–12, estimated.

Monthly discharge of San Luis Rey River near Pala, Cal., for the year ending Sept. 30, 1915.

Month.	Discharge in second-feet.			Run-off (in acre-feet).	Accuracy.
	Maximum.	Minimum.	Mean.		
October	5	3	4.18	257	C.
November	7.5	4.5	5.28	314	C.
December	13	6	8.37	515	C.
January	1,560	6	113	6,950	B.
February	3,300	66	577	32,000	B.
March	690	134	260	16,000	B.
April	550	60	144	8,570	B.
May	975	168	397	24,400	B.
June	158	15	67.6	4,020	B.
July	13	6	9.56	588	C.
August	14	5	7.03	432	C.
September	8	5.5	6.50	387	C.
The year	3,300	3	130	94,400	

SAN LUIS REY RIVER AT BONSALL, CAL.

Location. In the SW. ¼ sec. 20,[1] T. 10 S., R. 3 W., at concrete highway bridge at Bonsall, San Diego County, just above Moosa Canyon, about 14 miles below gaging station near Pala, and 14 miles above mouth of river.

Drainage area.—465 square miles (measured on topographic maps).

Records available.—April 16, 1912, to September 30, 1915.

Gage.—Staff in three sections on right bank 150 feet below bridge. Staff gage on left bank at bridge and at independent datum was used January 23 to March 25, 1915. Gage read twice daily by Julian Cantarini.

Discharge measurements.—Made from bridge above gage or by wading.

Channel and control.—Composed of sand; somewhat shifting.

Extremes of discharge.—Maximum stage recorded during year and period 1912–1915 7.0 feet from 7 to 9.30 a. m. February 11 (discharge, determined from extension of rating curve, about 9,000 second-feet). No flow for several months each year.

Diversions.—See San Luis Rey River near Pala. Morena ditch and Pala Indian Reservation canal divert water in the vicinity of Pala for irrigation. Water for irrigation is also pumped from wells along the river.

Regulation.—None.

Accuracy.—Results fair. Changes in channel are fairly well defined by frequent measurements.

Discharge measurements of San Luis Rey River at Bonsall, Cal., during the year ending Sept. 30, 1915.

Date.	Made by—	Gage height in feet.		Discharge.	Date.	Made by—	Gage height in feet.		Discharge.
		Old gage.	New gage.				Old gage.	New gage.	
				Sec.-ft.					*Sec.-ft.*
Dec. 14	F. C. Ebert	1.02	1.76	2.3	Mar. 1	F. C. Ebert	1.50	2.45	602
22	do	1.02	1.96	10	2	do	2.20	3.20	1,380
Jan. 10	Lee and Sleppy	1.02	([a])	12	11	do	1.61	2.43	312
23	F. C. Ebert	1.25	2.07	65	26	do	1.53	2.24	123
24	do	1.08	1.88	33	Apr. 7	do	1.48	2.24	101
25	do	1.22	1.91	38	17	D. L. Lee	1.46		71
Feb. 1	K. B. Sleppy	1.48		571	27	W. J. Isbell	1.58		132
5	do	1.71	2.55	268	May 6	W. D. McFadden	1.78	2.54	943
11	F. C. Ebert	3.30	4.28	3,230	16	F. C. Ebert	1.73	2.41	237
12	do	2.48	3.65	2,220	21	do	2.06		232
13	do	1.84	2.90	790	July 6	W. E. Keenan	1.23	1.82	8
14	do	1.76	2.65	616	13	F. C. Ebert			.7
27	do	1.43	2.40	304	Aug. 2	do			.0

[a] Water not flowing past gage, but rising from sand about 15 feet from channel.

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[1] Section given in previous reports is in error.

Daily discharge, in second-feet, of San Luis Rey River at Bonsall, Cal., for the year ending Sept. 30, 1915.

Day.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.
1		1.5	11	571	602	120	610	142	28	0.4
2		1.5	11	1,100	1,020	98	900	142	14	.4
3		1.5	11	1,920	440	80	620	142	14	.4
4		1.5	12	136	725	80	515	142	14	.4
5		1.5	12	312	440	80	2,050	142	14	.4
6		1.5	12	195	388	80	1,010	120	14	.4
7		1.5	12	163	388	80	715	120	12	.3
8		1.5	12	136	388	62	680	120	10.	.3
9		1.5	12	1,500	440	62	450	120	8	.3
10		1.5	12	5,130	440	62	415	98	6	.3
11		1.5	12	7,000	341	62	500	80	4	.3
12		20	12	1,680	326	80	415	80	2	.3
13		10	12	1,020	311	80	380	80	.7	.2
14		2.5	12	609	296	98	320	80	.7	.2
15	1	3	12	492	282	98	220	62	.7	.2
16	1	4	12	341	267	98	232	62	.7	.2
17	1	5	12	300	252	98	232	45	.7	.2
18	1	6	12	162	238	80	310	45	.7	.2
19	1	7	12	113	223	80	232	45	.6	.1
20	1	8	12	162	208	80	232	45	.6	.1
21	1	9	12	440	194	120	198	45	.6	.1
22	1	10	43	341	179	600	198	45	.6	.1
23	1	10	65	224	164	232	198	45	.6	.1
24	1	10	38	224	150	198	198	45	.6	.1
25	1	10	38	1,340	135	142	198	28	.6	.05
26	1	10	38	300	120	142	198	28	.5	.05
27	1	10	38	224	98	142	170	28	.5	.05
28	1	10	38	162	98	142	170	28	.5	.05
29	1	11	3,150		170	200	170	28	.5	.05
30	1	11	3,730		120	400	142	28	.5	.05
31		11	793		120		142		.5	.05

NOTE.—No flow Oct. 1 to Nov. 14, and Sept. 1–30.

Monthly discharge of San Luis Rey River at Bonsall, Cal., for the year ending Sept. 30, 1915.

Month.	Discharge in second-feet.			Run-off (total in acre-feet).	Accuracy.
	Maximum.	Minimum.	Mean.		
October	0.0	0.0	0.0	0	
November	1	.0	.53	32	
December	20	1.5	6.26	385	D.
January	3,730	11	265	16,300	C.
February	7,000	113	939	52,100	C.
March	1,020	98	308	18,900	C.
April	600	62	133	7,910	C.
May	2,050	142	420	25,800	D.
June	142	28	75.3	4,480	C.
July	28	.5	4.88	300	D.
August	.4	.05	.205	13	
September	.0	.0	.0	0	
The year	7,000	.0	175	126,000	

SAN LUIS REY RIVER NEAR OCEANSIDE, CAL.

Location.—In the SW. ¼ SW. ¼ sec. 13, T. 11 S., R. 5 W., opposite Oceanside pumping plant, just above ford, 1½ miles above mouth of river and about 2 miles northeast of Oceanside, San Diego County.

Drainage area.—563 square miles (measured on topographic maps).

Records available.—April 17, 1912, to September 30, 1915, when station was discontinued. Discharge measurements only for 1915.

Gage.—Staff in three sections on right bank.

Discharge measurements.—Made from concrete highway bridge three-fourths mile below gage or by wading.

Channel and control.—Composed of shifting sand.

Extremes of discharge.—Maximum stage recorded during year and period 1912–1915, 4.9 feet, crest of flood of February 11, 1915 (discharge determined from extension of rating curve, about 7,000 second-feet). No flow for several months each year.

Diversions.—Several small canals divert water for irrigation in Mission Valley, above station; see San Luis Rey River at Bonsall. Water is also pumped from wells at various points in the valley. Record at this station shows amount of water wasted into Pacific Ocean.

Regulation.—None.

Accuracy.—Gage-height record not reliable; determinations of discharge withheld.

Discharge measurements of San Luis Rey River near Oceanside, Cal., during the year ending Sept. 30, 1915.

Date.	Made by—	Gage height.	Discharge.	Date.	Made by—	Gage height.	Discharge.
		Feet.	*Sec.-ft.*			*Feet.*	*Sec.-ft.*
Dec. 14	F. C. Ebert		0.0	Mar. 26	F. C. Ebert	2.06	120
Jan. 23	do	[a] 0.79	[b] .2	Apr. 7	do	2.08	88
25	do	[a] .82	1.8	18	D. L. Lee	1.9	56
30	do		1,470	27	W. J. Isbell	2.23	150
Feb. 5	K. B. Sleppy	2.2	325	May 6	W. D. McFadden	3.3	1,250
14	F. C. Ebert	2.57	722	16	F. C. Ebert	2.43	222
27	do	2.17	296	July 6	do		.0
Mar. 11	do	2.30	345				

[a] Temporary gage on left bank opposite original gage and at same datum.
[b] Estimated.

AGUA CALIENTE CREEK NEAR WARNER SPRINGS, CAL.

Location.—In San José del Valle grant, San Diego County, about a mile northwest of Warner Springs.

Drainage area.—19.2 square miles (measured on topographic maps).

Records available.—February 5, 1913, to September 30, 1915, when station was discontinued. Discharge measurements only.

Gage.—Vertical staff on left bank just above artificial control. Original gage was washed out March 6, 1914, and new gage installed March 24, 1914, at independent datum.

Discharge measurements.—Made by wading near gage.

Channel and control.—Shifting sand.

Diversions.—None.

Regulation.—None.

Discharge measurements of Agua Caliente Creek near Warner Springs, Cal., during the year ending Sept. 30, 1915.

[Made by W. J. Isbell.]

Date.	Gage height.	Discharge.	Date.	Gage height.	Discharge.	Date.	Gage height.	Discharge.
	Feet.	*Sec.-ft.*		*Feet.*	*Sec.-ft.*		*Feet.*	*Sec.-ft.*
Oct. 16	0.35	0.2	May 22	1.50	13	Aug. 5	1.23	0.7
Jan. 1	.35	.4	July 1	1.29	2.0	12	1.23	.6
19	.42	.3	15	1.23	1.1	Sept. 3	1.21	.5
Mar. 24	([a])	9.4	22	1.23	.8	9	1.22	.4
Apr. 19		1.2	29	1.25	.6	30	1.27	.5
May 7		86						

[a] Gage washed out.

CANADA VERDE CREEK NEAR WARNER SPRINGS, CAL.

Location.—At mouth of canyon in San Jose del Valle grant, 1½ miles southeast of Warner Springs, San Diego County.

Drainage area.—2.8 square miles (measured on topographic maps).

Records available.—February 5, 1913, to September 30, 1915, when station was discontinued; discharge measurements only.

Gage.—Vertical staff on right bank at mouth of canyon.

Discharge measurements.—Made by wading near gage.

Channel and control.—Composed of shifting sand.

Diversions.—None.

Regulation.—None.

Discharge measurements of Canada Verde Creek near Warner Springs, Cal., during the year ending Sept. 30, 1915.

[Made by W. J. Isbell.]

Date.	Gage height.	Discharge.	Date.	Gage height.	Discharge.	Date.	Gage height.	Discharge.
	Feet.	*Sec.-ft.*		*Feet.*	*Sec.-ft.*		*Feet.*	*Sec.-ft.*
Oct. 16	1.66	0.2	Apr. 3	1.64	1.7	July 22	1.15	0.7
Dec. 15	1.73	.4	19	1.45	1.4	Aug. 5	.95	.1
Jan. 1	1.70	.4	May 22	1.54	4.6	29	1.00	.2
Feb. 5	1.88	1.4	June 24	1.03	.1			

WEST FORK OF SAN LUIS REY RIVER[1] NEAR WARNER SPRINGS, CAL.

Location.—In the SW. ¼ sec. 15, T. 10 S., R. 2 E., in San Jose del Valle grant, about 2¾ miles above junction with San Luis Rey River, and 7½ miles northwest of Warner Springs, San Diego County.

Drainage area.—25.6 square miles (measured on topographic maps).

Records available.—January 25, 1913, to September 30, 1915, when station was discontinued.

Gage.—Sanders & Rising water-stage recorder on left bank near mouth of canyon, with staff in two sections fastened to tree on same bank about 40 feet upstream.

Discharge measurements.—Made by wading near gage.

Channel and control.—Bed composed of shifting sand. A concrete control has been built across channel just below gage, but accumulation of sand caused slight changes in stage-discharge relation.

Extremes of discharge.—Maximum stage during year occurred February 11, when water-stage recorder was not in operation; mean daily discharge, estimated 365 second-feet. No flow during October and November.

1913–1915: Maximum stage recorded, 4.37 feet February 19, 1914 (discharge, 580 second-feet). No flow for several months each year.

Diversion.—None.

Regulation.—None.

Accuracy.—Results fair. Discharge determined by interpolation between measurements, from rating curves covering short periods, and by indirect method for shifting control. For high stages in January, February, and March, when gage-height record was missing, discharge was estimated as 25 per cent of the flow of San Luis Rey River near Mesa Grande.

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[1] Local name Rincon Creek.

Discharge measurements of West Fork of San Luis Rey River near Warner Springs, Cal., during the year ending Sept. 30, 1915.

[Made by W. J. Isbell.]

Date.	Gage height.	Discharge.	Date.	Gage height.	Discharge.	Date.	Gage height.	Discharge.
	Feet.	*Sec.-ft.*		*Feet.*	*Sec.-ft.*		*Feet.*	*Sec.-ft.*
Dec. 12	2.13	0.4	Apr. 8	2.67	19	July 1	2.51	5.7
Jan. 8	2.18	.5	16	2.54	17	8	2.53	4.7
27	2.46	5.6	23	2.97	62	15	2.50	2.4
31	3.07	68	May 7	3.38	159	22	2.45	2.1
Feb. 4	2.99	55	10	3.24	120	29	2.41	1.5
13	3.31	106	13	3.06	79	Aug. 5	2.35	1.0
18	2.98	50	20	2.94	52	12	2.31	.6
Mar. 4	3.10	66	27	2.80	31	19	2.29	.4
11	3.03	60	June 3	2.70	22	26	2.20	[a].06
18	2.83	37	10	2.63	20	Sept. 9	2.20	[a].05
25	2.73	27	24	2.56	8.8	16	2.28	.2

[a] Float measurement; coefficient, 1.00.

Daily discharge, in second-feet, of West Fork of San Luis Rey River near Warner Springs, Cal., for the year ending Sept. 30, 1915.

Day.	Dec.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.
1	0.1	0.8	68	100	23	123	36	5.5	1.5	0.1
2	.2	.8	260	125	23	103	36	5.5	1	.1
3	.2	.3	125	90	23	95	22	5.5	1	.1
4	.2	.8	55	66	22	104	22	5	1	.1
5	.2	1.0	50	66	19	260	22	5	1	.1
6	.2	1.0	38	66	19	155	20	4.5	.9	.1
7	.2	.8	34	63	19	182	20	4.5	.0	.1
8	.2	.8	30	63	19	215	20	4.5	.8	.1
9	.2	.8	105	63	19	155	20	4	.8	.1
10	.5	1.0	365	63	19	145	20	4	.7	.1
11	1.0	.8	385	63	18	155	19	3.5	.7	.1
12	.5	1.0	170	63	18	105	18	3.5	.6	.1
13	.2	.8	106	63	18	95	17	3	.6	.2
14	.2	.8	80	63	17	90	17	3	.6	.2
15	.1	.8	70	57	17	85	16	2.5	.5	.2
16	.2	.3	50	57	17	75	16	2.5	.5	.2
17	.5	.8	50	57	14	130	15	2.5	.4	.2
18	.5	.8	52	39	14	150	14	2.5	.4	.2
19	.5	.8	46	39	14	85	13	2.5	.4	.2
20	.5	.8	46	38	14	55	12	2	.4	.2
21	.5	1.0	46	34	28	45	11	2	.3	.2
22	.5	8.5	46	29	80	45	10	2	.3	.2
23	2.5	5.5	46	29	64	45	9	2	.2	.2
24	1.0	5.5	46	29	93	45	9	2	.2	.2
25	.8	20	82	29	86	39	8.5	2	.1	.2
26	.8	8.5	73	24	72	38	8	2	.1	.2
27	1.0	5.5	73	24	73	33	7.5	1.5	.6	.2
28	.8	43	66	24	71	36	7	1.5	.2	.2
29	.8	365	....	33	68	36	6.5	1.5	.1	.2
30	.8	200	....	33	122	36	6	1.5	.1	.2
31	.3	68	....	24	....	36	....	1.5	.1	....

NOTE.—No flow Oct. 1 to Nov. 30.

Monthly discharge of West Fork of San Luis Rey River near Warner Springs, Cal., for the year ending Sept. 30, 1915.

Month.	Discharge in second-feet.			Run-off (total in acre-feet).	Accuracy.
	Maximum.	Minimum.	Mean.		
October	0.0	0.0	0.0	0	
November	.0	.0	.0	0	
December	2.5	.1	.52	32	
January	365	.3	24.1	1,480	C.
February	385	30	95.1	5,280	C.
March	125	24	52.1	3,200	B.
April	122	14	37.5	2,230	C.
May	260	33	96.6	5,940	C.
June	36	6	15.9	946	C.
July	5.5	1.5	3.06	188	D.
August	1.5	.1	.55	34	
September	.2	.1	.16	10	
The year	385	.0	26.7	19,300	

CARRIZO CREEK NEAR WARNER SPRINGS, CAL.

Location.—At mouth of canyon, near southern boundary of Valle de San Jose grant, San Diego County, 2,000 feet above junction with Susanna Creek, about 7½ miles southwest of Warner Springs.

Drainage area.—4.9 square miles (measured on topographic maps).

Records available.—January 24, 1913, to September 30, 1915. when station was discontinued (discharge measurements only for the year 1912–13).

Gage.—Staff in two sections fastened to cottonwood tree on right bank; read about twice a week by hydrographer of Volcan Land & Water Co.

Discharge measurements.—Made by wading near gage.

Channel and control.—Bed composed of shifting sand. Timber control installed June 16, 1913.

Extremes of discharge.—Maximum stage during year not known; maximum mean daily discharge, estimated at 50 second-feet February 11. Minimum stage recorded, 2.45 feet August 19 (discharge, 0.1 second-foot).

1913–1915: Maximum stage not known as record is incomplete. Maximum mean daily discharge, estimated at 68 second-feet February 21, 1914; minimum discharge, estimated 0.1 second foot each year.

Diversions.—None.

Regulation.—None.

Accuracy.—Gage was read twice a week until June 30 and only on days of discharge measurements after that date. Discharge for days for which no readings were reported interpolated between measurements and estimated by comparison with record of flow of West Fork of San Luis Rey River near Warner Springs. Results poor.

Discharge measurements of Carrizo Creek near Warner Springs, Cal., during the year ending Sept. 30, 1915.

Date.	Made by—	Gage height.	Discharge.	Date.	Made by—	Gage height.	Discharge.
		Feet.	*Sec.-ft.*			*Feet.*	*Sec.-ft.*
Oct. 16	W. J. Isbell	2.53	0.1	May 8	W. J. Isbell	2.80	10
Nov. 16	.....do	2.55	.2	14	R. W. Day	2.70	3.5
Dec. 24	.....do	2.60	.8	June 28	W. J. Isbell	2.58	.6
Jan. 18	.....do	2.57	.4	July 10	.....do	2.57	.3
Feb. 7	.....do	2.70	2.0	16	.....do	2.58	.3
13	.....do	2.93	9.2	28	.....do	2.53	.3
Mar. 3	.....do	3.05	17	Aug. 2	.....do	2.54	.2
6	F. C. Ebert	2.85	6.6	6	.....do	2.54	.3
13	W. J. Isbell	2.80	4.8	14	.....do	2.56	.3
26	.....do	2.69	2.4	19	.....do	2.47	.1
Apr. 7	.....do	2.67	2.1	Sept. 11	.....do	2.48	.1
17	.....do	2.65	1.6	29	.....do	2.49	.2

Daily discharge in second-feet of Carrizo Creek near Warner Springs, Cal., for the year ending Sept. 30, 1915.

Day.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.
1	0.1	0.6	0.2	0.8	3	10	2.5	5	2.5	0.5	0.2	0.1
2	.1	.6	.2	.8	10	14	2	4	2.5	.5	.2	.1
3	.1	.6	.4	.5	5	17	2	3.5	2	.5	.2	.1
4	.1	.6	.6	.8	2	14	2	5	2	.5	.2	.1
5	.1	.6	.7	.8	2	10	2	13	2	.4	.3	.1
6	.1	.6	.7	.6	2	6.5	2	8	2	.4	.3	.1
7	.1	.4	.7	.4	2	6.5	2	9	2	.4	.3	.1
8	.1	.4	.7	.4	2	6	2	10	2	.4	.3	.1
9	.1	.3	1.0	.5	2	5.5	2	4	2	.3	.3	.1
10	.1	.3	1.5	.7	40	5	2	3.5	1.5	.3	.3	.1
11	.1	.2	1.0	.8	50	5	2	3.5	1.5	.3	.3	.1
12	.1	.2	.8	.7	17	5	2	3.5	1.5	.3	.3	1
13	.1	.2	.8	.7	9	5	1.5	3.5	1.5	.3	.3	.1
14	.1	.2	.8	.6	9	5	1.5	3.5	1.5	.3	.3	.1
15	.1	.2	.8	.6	9	4.5	1.5	3.5	1.5	.3	.3	.1
16	.1	.2	.8	.5	8.5	4.5	1.5	3.5	1.5	.3	.2	.1
17	.1	.2	.8	.5	8	4	1.5	3.5	1	.3	.2	.1
18	.1	.2	.8	.4	7	4	1.5	3.5	1	.3	.1	.1
19	.1	.2	.8	.4	6.5	3.5	1.5	3	1	.3	.1	.1
20	.1	.2	.8	.4	6.5	3.5	1.5	3	.9	.3	.1	.1
21	.1	.2	.8	.5	6.5	3	2	3	.9	.3	.1	.2
22	.6	.2	.8	1.5	6.5	2.5	2	3	.8	.3	.1	.2
23	.1	.2	.8	1.5	6.5	2.5	2.5	3	.8	.3	.1	.2
24	.1	.2	.8	1.5	6.5	2.5	2.5	3	.8	.3	.1	.2
25	.2	.2	.5	2.0	8.5	2.5	2.5	3	.7	.3	.1	.2
26	.3	.2	.3	.8	6.5	2.5	2.5	2.5	.7	.3	.1	.2
27	.4	.2	.5	.6	5	2.5	2.5	2.5	.6	.3	.1	.2
28	.5	.2	.8	4	4	2.5	2.5	2.5	.6	.3	.1	.2
29	.6	.2	.8	35	....	2.5	2.5	2.5	.6	.3	.1	.2
30	.6	.2	.5	20	....	2.5	5	2.5	.6	.3	.1	.2
31	.6	....	.3	7	....	2.5	....	2.5	....	.2	.1	....

NOTE.—Discharge determined as follows: Dec. 10 to Apr. 29, from a fairly well-defined rating curve; for the remainder of the year, directly from current-meter measurements or by comparison with record of flow of San Luis Rey River near Warner Springs. See "Accuracy" in the station description.

Monthly discharge of Carrizo Creek near Warner Springs, Cal., for the year ending Sept. 30, 1915.

Month.	Discharge in second-feet.			Run-off (total in acre-feet).	Accuracy.
	Maximum.	Minimum.	Mean.		
October	0.6	0.1	0.20	12	
November	.6	.2	.30	18	
December	1.5	.2	.70	43	
January	35	.4	2.78	171	D.
February	50	2	8.95	497	D.
March	17	2.5	5.37	330	D.
April	5	1.5	2.10	125	D.
May	13	2.5	4.16	256	D.
June	2.5	.6	1.35	80	D.
July	.5	.2	.34	21	
August	.3	.1	.19	12	
September	.2	.1	.13	8	
The year	50	.1	2.17	1,570	

SUSANNA CREEK NEAR WARNER SPRINGS, CAL.

Location.—At mouth of canyon, near southern boundary of Valle de San Jose grant, San Diego County, 1,000 feet above junction with Carrizo Creek, and about 7½ miles southwest of Warner Springs.

Drainage area.—4.6 square miles (measured on topographic maps).

Records available.—Febraury 1, 1913, to September 30, 1915, when station was discontinued (discharge measurements only for year 1912–13).

Gage.—Staff bolted to upstream side of left bridge abutment; read about twice a week by hydrographer of Volcan Land & Water Co.

Discharge measurements.—Made by wading near gage.

Channel and control.—Bed composed of shifting sand. July 14, 1913, a plank was placed horizontally between abutments of bridge for a control.

Extremes of discharge.—Maximum stage during year is not known; maximum mean daily discharge, estimated at 70 second-feet February 11. No flow October 1 to December 16.

1913–1915: Maximum stage not known as record is incomplete. Maximum mean daily discharge, estimated at 70 second-feet February 21, 1914, and February 11, 1915. No flow for several months each year.

Diversions.—None.

Regulation.—None.

Accuracy.—Gage read about twice a week until June 30 and on days of discharge measurements after that date. Discharge for days on which gage was not read were estimated by interpolation or by comparison with record of flow of Carrizo Creek and West Fork of San Luis Rey River. Results poor.

Discharge measurements of Susanna Creek near Warner Springs, Cal., during the year ending Sept. 30, 1915.

Date.	Made by—	Gage height.	Discharge.	Date.	Made by—	Gage height.	Discharge.
		Feet.	*Sec.-ft.*			*Feet.*	*Sec.-ft.*
Dec. 21	W. J. Isbell	0.50	0.9	May 8	W. J. Isbell	1.20	27
31	do	.46	.4	14	R. W. Day	.87	13
Jan. 8	do	.47	.4	June 28	W. J. Isbell	.54	2.6
18	do	.47	.4	July 10	do	.50	1.2
Feb. 7	do	.67	5.8	16	do	.47	.9
13	do	.99	18	28	do	.46	.7
Mar. 3	do	.80	10	Aug. 2	do	.46	.4
6	F. C. Ebert	.86	11	6	do	.45	.7
13	W. J. Isbell	.79	10	14	do	.44	.5
26	do	.66	5.5	Sept. 11	do	.39	.1
Apr. 7	do	.59	4.3	29	do	.40	.1
17	do	.56	4.2				

Daily discharge, in second-feet, of Susanna Creek near Warner Springs, Cal., for the year ending Sept. 30, 1915.

Day.	Dec.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.
1	....	0.4	8	10	6	15	6.5	2	0.4	0.2
2	....	.4	25	12	5	12	6.5	2	.4	.2
3	....	.4	16	10	5	11	6	2	.4	.2
4	....	.4	11	10	5	15	6	2	.5	.2
5	....	.4	9	11	5	30	6	1.5	.6	.2
6	....	.4	7	11	5	20	6	1.5	.7	.2
7	....	.4	6	11	4.5	23	6	1.5	.7	.2
8	....	.4	5	12	4.5	27	5.5	1	.7	.1
9	....	.4	5	13	4	15	5	1	.6	.1
10	....	.4	55	13	4	10	5	1	.6	.1
11	....	.4	70	12	4	9.5	4.5	1	.6	.1
12	....	.4	26	11	4	10	4	1	.5	.1
13	....	.4	18	10	6	12	3.5	1	.5	.1
14	....	.4	18	10	7.5	13	3.5	.9	.5	.1
15	....	.4	18	9	6	13	3.5	.9	.5	.1
16	....	.4	11	9	5	12	3.5	.9	.5	.1
17	0.1	.4	10	9	4	12	3	.9	.5	.1
18	.5	.4	10	8	4	11	3	.9	.4	.1
19	1.0	.4	9	8	4	11	3	.9	.4	.1
20	.9	.4	9	8	4	10	3	.8	.4	.1
21	.9	.4	9	7	5	10	2.5	.8	.4	.1
22	.8	1	8.5	6	5.5	9	2.5	.8	.4	.1
23	.8	1	8.5	6	6.5	9	2.5	.8	.4	.1
24	.7	4	8.5	6	6.5	9	2.5	.8	.4	.1
25	.6	3	24	5.5	6.5	9	2.5	.7	.3	.1
26	.4	2	11	5.5	6.5	8	2.5	.7	.3	.1
27	.4	1.5	9	6	6	7.5	2.5	.7	.3	.1
28	.4	5	8	6	6	7.5	2.5	.7	.3	.1
29	.4	50	....	6.5	6.5	7	2.5	.7	.3	.1
30	.4	30	....	6.5	15	7	2.5	.6	.3	.1
31	.4	8	....	6.5	....	6.5	....	.5	.3	....

NOTE.—Discharge determined from rating curves defined as follows: Dec. 17 to Feb. 2, poorly defined; Feb. 3 to Mar. 28 and May 6 to June 24, fairly well defined; Mar. 29 to May 5, poorly defined. No flow Oct. 1 to Dec. 16. See "Accuracy" in the station description.

Monthly discharge of Susanna Creek near Warner Springs, Cal., for the year ending Sept. 30, 1915.

Month.	Discharge in second-feet.			Run-off (total in acre-feet).	Accuracy.
	Maximum.	Minimum.	Mean.		
October	0.0	0.0	0.0	0	
November	.0	.0	.0	0	
December	1	.0	.28	17	D.
January	50	.4	3.67	226	D.
February	70	5	15.4	855	D.
March	13	5.5	8.85	544	D.
April	15	4	5.55	330	D.
May	30	6.5	12.3	756	D.
June	6.5	2.5	3.93	234	D.
July	2	.5	1.05	65	
August	.7	.3	.46	28	
September	.2	.1	.12	7	
The year	70	.0	4.23	3,060	

MATAGUAL CREEK NEAR WARNER SPRINGS, CAL.

Location.—In the SE. ¼ sec. 28, T. 11 S., R. 3 E., San Diego County, in Valle de San Jose grant, near mouth of canyon, and about 5 miles southwest of Warner Springs.

Drainage area.—9.2 square miles (measured on topographic maps).

Records available.—November 16, 1912, to September 30, 1915, when station was discontinued (discharge measurements only for year 1912–13).

Gage.—Depth of water over a reference hub in pool above control is measured about once a week by hydrographer of Volcan Land & Water Co.

Discharge measurements.—Made by wading near gage.

Channel and control.—Channel composed of shifting sand. A timber control has been constructed just below gage.

Extremes of discharge.—Maximum stage during year not known; maximum mean daily discharge for year, estimated as 75 second-feet February 11; minimum stage recorded, 0.15 foot October 20 (discharge, 0.2 second-foot).

1912–1915: Maximum stage not known; record incomplete; maximum mean daily discharge, 125 second-feet (estimated) February 21, 1914; minimum discharge, 0.2 second-foot (estimated) September, 1914.

Diversions.—None.

Regulation.—None.

Accuracy.—Gage read only once a week; discharge for days on which gage was not read interpolated between measurements or estimated by comparison with records on West Fork of San Luis Rey River and Carrizo Creek near Warner Springs. Results poor.

Discharge measurements of Matagual Creek near Warner Springs, Cal., during the year ending Sept. 30, 1915.

Date.	Made by—	Gage height.	Discharge.	Date.	Made by—	Gage height.	Discharge.
		Feet.	*Sec.-ft.*			*Feet.*	*Sec.-ft.*
Oct. 16	W. J. Isbell	0.18	0.3	Apr. 17	W. J. Isbell	0.58	3.8
Nov. 28	do	.20	.5	May 8	do	.98	20
Dec. 14	do	.23	.8	14	R. W. Day	.85	10
21	do	.26	.9	June 28	W. J. Isbell	.56	3.4
Jan. 8	do	.23	.7	July 10	do	.39	1.8
18	do	.24	.6	16	do	.34	1.3
Feb. 4	do	.83	10	27	do	.37	1.7
13	do	.93	16	Aug. 9	do	.36	1.5
19	do	.79	8.7	14	do	.35	1.3
Mar. 3	do	.83	11	19	do	.29	.7
13	do	.80	11	27	do	.36	1.3
26	do	.64	5.8	Sept. 11	do	.32	.7
Apr. 3	do	.63	4.5	29	do	.34	.9

Daily discharge, in second-feet, of Matagual Creek near Warner Springs, Cal., for the year ending Sept. 30, 1915.

Day.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May.	June	July.	Aug.	Sept.
1	0.3	0.8	0.6	0.7	10	20	5	15	8	3	1.5	1
2	.3	.8	[a].6	.7	30	15	4	10	8	3	1.5	1
3	.3	.6	.6	.7	20	[a]11	[a]4.5	[a]12	[a]8	3	1.5	1
4	[a].3	.6	.6	.7	[a]10	11	4	15	8	3	1.5	.9
5	.3	.5	.6	[a].7	5	11	4	25	7.5	2.5	1.5	.9
6	.3	.4	.5	.7	5	11	4	20	7.5	2.5	1.5	.9
7	.3	[a].3	.5	.7	4	11	4	20	7	2.5	1.5	.8
8	.3	.3	[a].5	[a].7	4	11	[a]4	[a]20	7	2	1.5	.8
9	.3	.3	1.0	.7	[a]4	11	4	15	6.5	2	[a]1.5	.8
10	.3	.3	1.5	[a].7	60	[a]11	4	15	[a]6.5	[a]2	1.5	.7
11	.3	.4	1.0	.7	75	11	4	15	6	2	1.5	[a].7
12	.3	.4	.8	.7	30	11	4	12	5	2	1.5	.7
13	.3	.4	.8	.7	[a]16	[a]11	4	11	4.5	1.5	1.5	.7
14	[a].3	[a].4	[a].8	.6	14	10	4	[a]10	[a]4	1.5	[a]1.5	.7
15	.3	.4	.8	.6	[a]12	9	4	10	4	1.5	1.5	.7
16	[a].3	[a].4	.8	.6	11	9	4	10	4	[a]1.5	1	.8
17	.3	.4	.8	.6	10	8	[a]4	10	4	1.5	.9	.8
18	.2	.4	.9	[a].6	9	8	4	10	4	1.5	.8	.8
19	.2	.4	.9	.6	[a]8.5	7	4	10	4	1.5	[a].7	.8
20	[a].2	.4	.9	.6	9	7	4	9	4	1.5	.7	.8
21	.2	.4	[a].9	1	9.5	6	5	9	4	1.5	.8	.8
22	.8	.5	.9	2	[a]10	6	5	9	3.5	1.5	.9	.8
23	[a].3	.5	.9	2	10	6	5	9	3.5	1.5	1	.8
24	.3	.5	.9	2	10	6	5	9	3.5	1.5	1	.8
25	.3	.5	.5	3	10	6	5	9	3.5	1.5	1	.9
26	.3	.5	.4	[a].8	10	[a]6	5	9	3.5	1.5	1.5	.9
27	.5	.5	.5	.6	[a]10	6	5	9	3.5	[a]1.5	[a]1.5	.9
28	.7	[a].5	.8	7	8	6	5	9	[a]3.5	1.5	1.5	.9
29	.8	.5	[a].8	55	....	5	5	9	[a]3.5	1.5	1.5	[a].9
30	.8	.5	.6	35	....	5	10	8	3.5	1.5	1.5	.9
31	.8	....	.4	10	....	[a]5	....	8	....	1.5	1.5	....

[a] Gage read on this day.

Monthly discharge of Matagual Creek near Warner Springs, Cal., for the year ending Sept. 30, 1915.

Month.	Discharge in second-feet.			Run-off (total in acre-feet).	Accuracy.
	Maximum.	Minimum.	Mean.		
October	0.8	0.2	0.37	23	
November	.8	.3	.46	27	
December	1.5	.4	.75	46	
January	55	.6	4.25	261	D.
February	75	4	15.1	839	D.
March	20	5	8.94	550	D.
April	10	4	4.55	271	D.
May	25	8	12.0	738	D.
June	8	3.5	5.10	304	D.
July	3	1.5	1.87	115	D.
August	1.5	.7	1.30	80	D.
September	1.0	.7	.83	49	
The year	75	.2	4.56	3,300	

ESCONDIDO MUTUAL WATER CO.'S CANAL NEAR NELLIE, CAL.

Location.—In the SW. ¼ NW. ¼ sec. 33, T. 10 S., R. 1 E., 500 feet below intake on left bank of San Luis Rey River, about 3½ miles above Rincon Indian Reservation, 4 miles southwest of Nellie, San Diego County, and 15 miles northeast of Escondido.

Records available.—October 1, 1896, to September 30, 1915, except that there are no records for the years ending September 30, 1902 and 1904.

Discharge.—November, 1896, to August, 1909, a weir in the wooden flume, about 200 feet below the sand box at the intake, was used. The weir consisted of a 1-inch board, held in position by guides fastened to the sides of the flume. Different widths of boards, ranging from 6 to 12 inches, were used during this period. The head on the weir was read by holding a foot-rule on the crest. January 1, 1910, to August 1, 1914, except December 1, 1912, to May 4, 1913, the weir was at the lower end of the sand box. The crest length was 6 feet and there was one partial end contraction. The head was measured from the top of a stake set level with the crest and 2 feet upstream. December 1, 1912, to May 4, 1913, observations were made over a 4 by 6 inch timber laid on its 4-inch face in a straight section of the concrete canal opposite the zanjero's house at the tunnel camp about two miles below the intake. The length of the weir was 65 inches and the head was measured from the top of a stake set level with the crest and 4 feet upstream. Recently Mr. E. R. Bowen developed rating curves for the various crude weirs which have been in use and recomputed past records. The following tables of daily and monthly discharge supersede those published in previous water-supply papers.

Cooperation.—Record, as published, was furnished by J. B. Lippincott.

The canal, which is 5.6 miles long, consists of flume, ditch, and tunnel sections constructed through a very rough, mountainous country. It discharges into a reservoir about 6 miles northeast of Escondido. The dam, which is 76 feet high and 380 feet long, is of the usual rock-fill type with a facing of redwood planks. The reservoir (capacity 3,120 acre-feet) supplies water for irrigation and domestic use at Escondido and vicinity.

Discharge measurements of Escondido Mutual Water Co.'s canal near Nellie, Cal., during the year ending Sept. 30, 1915.

Date.	Made by—	Gage height.[a]	Discharge.	Date.	Made by—	Gage height.[a]	Discharge.
		Feet.	*Sec.-ft.*			*Feet.*	*Sec.-ft.*
June 11	W. J. Isbell	0.56	8.9	July 29	W. J. Isbell	0.52	9.1
25	.....do	.91	21	Aug. 7	.....do	.40	5.7
July 2	.....do	.89	20	7	.....do	.36	4.6
9	.....do	.84	18.0	7	.....do	.30	3.5
12	F. C. Ebert	.63	10.6	7	.....do	.14	1.0
24	W. J. Isbell	.53	9.6				

[a] Head on weir.

Daily discharge, in second-feet, of Escondido Mutual Water Co.'s canal near Nellie, Cal., for the years ending Sept. 30, 1897–1915.

Day.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June.	July	Aug.	Sept.
1896–97.												
1	1.2	4.25	6.2	[a]8.6	[a]31.2	[b]31.2	......	8.6	......	......	......	......
2	1.2	3.6	6.2	8.6	[a]35.0	[a]40.8	......	8.6	......	......	......	......
3	.85	3.1	5.5	7.7	[a]35.5	[a]37.2	......	8.6	......	......	......	......
4	.85	3.1	5.5	[a]7.7	[a]35.0	[a]35.0	......	8.6	......	......	......	......
5	.85	3.1	5.5	6.95	[a]33.1	[a]40.8	......	6.95	......	......	......	......
6	.85	3.6	5.5	6.95	[a]36.0	[a]38.0	35.0	6.95	......	......	......	......
7	.85	3.6	5.5	6.2	[a]37.0	[b]35.0	[a]29.2	5.5	......	......	......	......
8	.85	3.6	5.5	6.2	[c]31.2	......	[a]31.2	5.5	......	......	......	......
9	1.05	3.6	4.9	6.2	[a]33.1	[c]31.2	[a]31.2	4.25	......	......	......	......
10	1.05	4.9	4.9	[a]9.1	[a]26.3	[a]33.1	[a]33.1	4.25	......	......	......	......
11	1.2	6.2	5.5	[a]19.5	[a]23.4	[a]33.1	[a]29.2	4.25	......	......	......	......
12	1.2	5.2	5.5	[a]19.5	[a]23.4	[a]37.0	[a]33.1	4.25	......	......	......	......
13	1.2	4.25	6.2	23.4	[a]23.4	[a]38.9	[a]37.0	4.25	......	......	......	......
14	1.65	3.6	5.5	......	[a]23.4	[a]37.0	[a]35.0	3.1	......	......	......	......
15	1.65	3.1	5.5	......	[a]22.0	[a]37.0	[a]31.2	3.1	......	......	......	......
16	1.4	3.6	15.6	......	[a]20.4	[a]35.0	[a]33.2	3.1	......	......	......	......
17	1.65	3.1	10.2	13.8	[a]21.9	[a]31.2	[a]27.2	3.1	......	......	......	......
18	1.85	3.1	9.4	21.4	[b]31.2	[a]29.2	[a]27.2	3.1	......	......	......	......
19	1.65	3.1	8.6	[a]25.4	......	[a]24.4	[a]25.4	3.1	......	......	......	......
20	2.05	3.1	6.95	[a]25.4	......	[a]15.6	[a]25.4	3.1	......	......	......	......
21	2.8	3.1	5.5	[a]28.8	......	[a]15.6	[a]19.5	2.05	......	......	......	......
22	3.1	3.1	5.5	[a]24.1	......	[a]15.6	[a]15.6	......	......	......	......	......
23	3.1	3.1	5.5	[a]22.5	......	[a]15.6	12.0	......	......	......	......	......
24	2.55	4.25	5.5	[a]22.5	[a]31.2	[a]15.6	12.0	......	......	......	......	......
25	2.55	19.4	4.25	[a]22.5	[a]35.0	[a]15.6	12.0	......	......	......	......	......
26	2.55	......	4.25	[a]22.5	[a]35.0	[a]15.6	12.0	......	......	......	......	......
27	8.6	8.6	4.25	[a]23.0	[a]35.0	[a] 5.5	12.0	......	......	......	......	......
28	12.0	7.7	[a]10.6	[a]22.0	[a]33.1	[a] 5.5	12.0	......	......	......	......	......
29	9.4	7.7	[a]21.4	[a]27.3	......	[a] 5.5	12.0	......	......	......	......	......
30	4.25	6.2	[a]11.1	[a]32.2	......	[a] 5.5	12.0	......	......	......	......	......
31	4.25	......	[a] 9.0	[a]35.0	......	......	......	......	......	......	......	......
1997–98.												
1	......	......	......	6.2	[a]18.5	[a]10.2	[a]13.8	......	......	......	......	......
2	......	......	4.25	5.5	[a]18.5	[a]10.2	[a]13.1	......	......	......	......	......
3	......	......	4.25	10.2	[a]18.5	[a]10.2	[a]12.2	......	......	......	......	......
4	......	......	4.25	10.2	[a]17.5	[a]10.0	[a]11.8	......	......	......	......	......
5	......	......	4.25	6.95	[a]17.5	[a] 9.8	[a]11.1	......	......	......	......	......
6	......	......	3.6	9.4	[a]16.1	[a] 9.4	[a]10.4	......	......	......	......	......
7	......	......	3.6	9.4	[a]17.5	[a] 9.8	[a]10.2	......	......	......	......	......
8	......	......	3.6	[a]35.6	[a]37.0	[a]10.2	[a]10.2	......	......	......	......	......
9	......	......	3.1	......	[a]25.3	[a] 9.8	[a]10.2	......	......	......	......	......
10	......	......	3.1	12.0	[a]21.4	[a]29.2	[a]10.2	......	......	......	......	......
11	......	......	3.1	[b]12.0	[a]20.0	[a]35.0	[a]10.2	......	......	......	......	......
12	......	......	3.1	......	[a]16.6	[a]23.4	[a]10.2	......	......	......	......	......
13	......	......	3.1	8.6	[a]14.2	[a]19.2	8.1	......	......	......	......	......
14	......	......	3.1	[a]20.4	[a]12.7	[a]21.4	7.7	......	......	......	......	......
15	......	......	......	[a]21.4	[a]12.0	[a]25.8	7.7	......	......	......	......	......
16	......	......	8.6	[a]20.8	[a]12.0	[a]20.0	[a] 8.15	......	......	......	......	......
17	......	......	6.95	[a]28.3	[a]15.2	[a]23.9	11.6	......	......	......	......	......
18	......	......	12.0	[a]29.2	[a]25.3	[a]23.8	......	......	......	......	......	......
19	......	......	......	[a]21.4	[a]18.5	[a]29.2	......	......	......	......	......	......
20	......	......	12.0	[a]20.4	[a]15.2	[a]31.2	......	......	......	......	......	......
21	......	......	12.0	[a]16.2	[a]14.0	[a]23.4	......	......	......	......	......	......
22	......	......	12.0	[a]14.7	[a]12.4	[a]19.0	......	......	......	......	......	......
23	......	......	12.0	[a]30.2	[a]11.6	[a]21.0	......	......	......	......	......	......
24	......	......	12.0	[a]34.0	[a]11.1	[a]17.3	......	......	......	......	......	......
25	......	......	10.2	[a]27.3	[a]11.1	[a]15.6	......	......	......	......	......	......
26	......	......	10.2	[a]21.4	[a]11.1	[a]30.2	......	......	......	......	......	......
27	......	......	10.2	[a]15.7	[a]11.1	[a]26.3	......	......	......	......	......	......
28	......	......	8.6	[a]21.4	[a]10.4	[a]24.1	......	......	......	......	......	......
29	......	......	8.6	[a]24.4	......	[a]20.7	......	......	......	......	......	......
30	......	......	8.6	[a]21.4	......	[a]17.0	......	......	......	......	......	......
31	......	......	6.95	[a]17.5	......	[a]15.2	......	......	......	......	......	......

[a] Mean of a. m. and p. m. readings. [b] No flow in p. m. [c] No flow in a. m.

NOTE.—Gage was read once each day unless otherwise indicated. Canal was dry on days for which no discharge is given. These tables supersede those previously published in water-supply papers.

Daily discharge, in second-feet, of Escondido Mutual Water Co.'s canal near Nellie, Cal., for the years ending Sept. 30, 1897–1915—Continued.

Day.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.
1898–99.												
1	......	......	......	......	3.6	6.6	12.9	......	......	......	......	......
2	......	......	......	......	21.4	6.2	11.1	......	......	......	......	......
3	......	......	......	......	35.0	5.85	10.6	......	......	......	......	......
4	......	......	......	......	15.6	5.5	10.2	......	......	......	......	......
5	......	......	......	......	17.5	4.9	9.8	......	......	......	......	......
6	......	......	......	......	12.0	4.25	9.4	......	......	......	......	......
7	......	......	......	......	12.0	4.25	8.6	......	......	......	......	......
8	......	......	......	......	12.0	4.25	7.7	......	......	......	......	......
9	......	......	......	......	11.1	4.25	7.3	......	......	......	......	......
10	......	......	......	......	10.6	4.25	6.95	......	......	......	......	......
11	......	......	......	......	10.2	4.25	6.6	......	......	......	......	......
12	......	......	......	......	9.4	4.25	6.2	......	......	......	......	......
13	......	......	......	......	9.4	4.25	5.5	......	......	......	......	......
14	......	......	......	......	9.4	4.25	5.2	......	......	......	......	......
15	......	......	......	......	9.4	4.25	4.9	......	......	......	......	......
16	......	......	......	6.95	8.6	4.25	4.55	......	......	......	......	......
17	......	......	......	6.95	8.1	[a]33.1	4.25	......	......	......	......	......
18	......	......	......	6.95	6.95	[a]29.2	......	......	......	......	......	......
19	......	......	......	6.6	6.6	[a]17.6	......	......	......	......	......	......
20	......	......	......	6.2	6.2	[a]26.4	......	......	......	......	......	......
21	......	......	......	5.85	5.85	[a]33.1	......	......	......	......	......	......
22	......	......	......	5.5	5.5	[a]23.4	......	......	......	......	......	......
23	......	......	......	3.6	5.5	[a]16.6	......	......	......	......	......	......
24	......	......	......	4.25	19.4	13.8	......	......	......	......	......	......
25	......	......	......	4.25	12.0	12.9	......	......	......	......	......	......
26	......	......	......	4.25	8.6	22.5	5.5	......	......	......	......	......
27	......	......	......	3.95	7.7	13.8	4.9	......	......	......	......	......
28	......	......	......	3.6	6.95	12.9	......	......	......	......	......	......
29	......	......	......	3.6	......	......	......	......	......	......	......	......
30	......	......	......	3.6	......	16.6	......	......	......	......	......	......
31	......	......	......	3.6	......	13.8	......	......	......	......	......	......
1899–1900.												
1	......	......	......	5.2	6.95	3.95	4.25	7.3	......	......	......	......
2	......	......	......	4.9	6.95	4.25	4.25	6.95	......	......	......	......
3	......	......	......	[a]8.75	6.95	4.25	5.5	6.2	......	......	......	......
4	......	......	......	6.95	6.95	[a]6.42	5.5	10.2	......	......	......	......
5	......	......	......	[a]19.5	7.3	12.0	5.5	[a]19.6	......	......	......	......
6	......	......	......	[a]13.1	7.3	7.7	5.2	[a]29.2	......	......	......	......
7	......	......	......	[a]11.6	6.95	6.95	5.5	15.6	......	......	......	......
8	......	......	......	10.2	6.95	6.2	6.95	12.0	......	......	......	......
9	......	......	......	9.8	6.95	5.5	6.95	8.6	......	......	......	......
10	......	......	......	9.4	6.95	5.5	6.2	6.95	......	......	......	......
11	......	......	......	8.1	6.95	5.2	5.5	12.9	......	......	......	......
12	......	......	......	7.7	6.95	4.55	4.9	15.6	......	......	......	......
13	......	......	......	7.7	6.95	4.55	4.55	10.2	......	......	......	......
14	......	......	......	7.7	6.95	4.55	4.9	8.6	......	......	......	......
15	......	......	......	7.7	6.95	[a]12.1	4.25	6.95	......	......	......	......
16	......	......	......	7.7	6.6	4.55	3.95	4.9	......	......	......	......
17	......	......	......	6.95	6.6	4.55	3.6	......	......	......	......	......
18	......	......	......	6.95	6.2	4.25	3.35	......	......	......	......	......
19	......	......	......	6.95	6.95	4.55	3.1	......	......	......	......	......
20	......	......	......	6.95	6.6	4.55	3.1	......	......	......	......	......
21	......	......	......	6.95	6.6	4.55	12.0	......	......	......	......	......
22	......	......	......	6.95	6.2	4.9	25.4	......	......	......	......	......
23	......	......	......	6.95	5.5	[a]10.3	13.8	......	......	......	......	......
24	......	......	......	6.95	4.55	10.2	10.2	......	......	......	......	......
25	......	......	......	6.95	4.55	5.5	7.3	......	......	......	......	......
26	......	......	......	7.3	4.25	5.2	6.95	......	......	......	......	......
27	......	......	......	7.3	3.95	4.9	7.7	......	......	......	......	......
28	......	......	......	7.3	3.6	4.55	[a]17.7	......	......	......	......	......
29	......	......	......	6.95	......	4.55	[a]13.4	......	......	......	......	......
30	......	......	......	6.95	......	4.25	9.4	......	......	......	......	......
31	......	......	......	6.95	......	4.25	......	......	......	......	......	......

[a] Mean of a. m. and p. m. readings.

Daily discharge, in second-feet, of Escondido Mutual Water Co.'s canal near Nellie, Cal., for the years ending Sept. 30, 1897–1915—Continued.

Day.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.
1900–1.												
1			3.6		[a]21.4		19.4					
2			3.6		[a]27.3		18.4					
3			3.35		[a]27.3		17.5					
4			3.35		31.2		21.4					
5			3.35	3.1	33.1		19.4					
6			3.35	12.0			18.4					
7			3.35	25.4			20.5					
8			3.1				17.5					
9			3.1	15.6		11.1	16.6					
10			3.1	12.0		17.5	15.6					
11				10.2		23.4	14.7					
12				8.6	12.0	25.4						
13				6.95	23.4	23.4						
14				6.2	31.2	21.4						
15				5.5	33.1	19.4						
16		1.85		5.5	33.1	19.4						
17		10.2		5.5		19.4						
18		15.6		5.5		18.4						
19		15.6		5.5		17.5						
20		12.0		8.6		17.5						
21		10.2		[a]20.4		19.4						
22		21.4		[a]17.5		19.4						
23		21.4		14.7		18.4						
24		10.2		12.9		17.5						
25		6.95		23.4		16.6						
26		5.5		25.4		16.1						
27		5.2		17.5		15.6						
28		3.6		17.5		14.7						
29		3.6		15.6		13.8						
30		4.25		12.0		20.5						
31				10.6		20.5						
1902–3.												
1				5.5	[a]10.6	[a]16.1	[a]15.6	[a]27.2				
2				5.5	[a]15.6	[a]13.6		[a]10.2				
3				5.5	[a]27.2	[a]13 8	[b]15.6	[a]10.2				
4				5.5	[a] 5.5	[a]14.7	[a]27.2	[a]10.2				
5			2.0	5.5	[a]27.2	[a]18.5	[a]27.2	[a]10.2				
6				5.5	[a]27.2	[a]27.2	[a]27.2	[a]12.0				
7			2.0	5.5	[a]25.3	[a]27.2	[a]27.2	[a]12.0				
8				5.5	[a]26.3	[a]27.2	[a]27.2	[a]12.0				
9				5.5	[a]27.2	[a]27.2	[a]27.2	12.0				
10				3.6	[a]27.2	[a]26.8	[a]27.2					
11			4.5	3.6	[a]27.2	[a]26.3	[a]27.2					
12				3.6	[a]27.2	[a]24.8	[a]27.2					
13			9.0	3.6	[a]26 3	[a]23.8	[a]27.2					
14				3.6	[a]21.4	[a]22.2	[a]27.2					
15				3.6	[a]24.4	[a]20.5	5.5					
16				3.6	[a]23.4	[a]20.0	5 5					
17				3.6	[a]23 4	[a]25.3						
18				3.6	[a]23.4	[a]21.4						
19		4.0		3.6	[a]23 9	[a]18.0						
20				3.6	[a]23.9	[a]16.1						
21		6.5		3.6	[a]23.9	[a]16.1						
22				3.6	[a]23.9	[a]15.2						
23				3.6	[a]22.4	[a]14.2						
24				3.6	[a]24.4	[a]21.4	[a]15.6					
25				[a] 4.9	[a]23.9	[a]27.2	[a]27.2					
26				[a] 6.6	[a]21.9	[a]27.2	[a]27.2					
27				[a] 5.85	[a]19.5	[a]23.9	[a]27.2					
28				[a]11.6	[a]17.0	[a]20.0	[a]27.2					
29		2.5		[a]21.4		[a]18.0	[a]27.2					
30				[a]10.7		[a]19.0	[a]25.3					
31				[a]12.9		[a]27.2						

[a] Mean of a. m. and p. m. readings.

[b] No flow in a. m.

Daily discharge, in second-feet, of Escondido Mutual Water Co.'s canal near Nellie, Cal., for the years ending Sept. 30, 1897–1915—Continued.

Day.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.
1904–5.												
1						[a]27.8	[a]27.2	[a]27.2				
2						[a]25.8	[a]27.2					
3						[a]27.2	[a]27.2					
4						[a]28.2	[a]27.2	[a]15.6				
5						[a]27.2	[a]27.2	[a]26.3				
6						[a]26.8	[a]2.72	[a]27.2				
7						[a]27.2	[a]27.2	[a]27.2				
8						[a]26.8	[a]27.2	[a]25.8				
9						[a]25.8	[a]27.2	[a]27.2				
10						[a]23.0	[a]27.2	[a]27.2				
11						[a]22.4	[a]27.2	[a]27.2				
12						[a]26.3	[a]27.2	[a]27.2				
13						[a]24.8	[a]27.2	[a]27.2				
14						[a]26.3	[a]27.2	[a]27.2				
15						[a]24.4	[a]27.2	[a]27.2				
16							[a]27.2					
17							[a]27.2					
18							[a]27.2					
19							[a]27.8					
20							[a]27.2					
21							[a]27.2					
22							[a]27.2					
23							[a]27.2					
24						15.6	[a]27.2					
25						[a]22.5	[a]27.2					
26						[a]22.5	[a]27.2					
27						[a]22.5	[a]27.2					
28						[a]26.3	[a]27.2					
29						[a]27.2	[a]27.2					
30						[a]27.8	[a]27.2					
31						[a]27.2						
1905–6.												
1					[a]12.4	[a]27.2						
2					[a]12.6	[a]26.8						
3					[a]10.2	[a]24.8						
4					[a]10.2							
5					[a]11.1							
6					[a]12.0							
7					[a]24.4	[a]11.1						
8					[a]23.4	[a]10.2						
9					[a]26.3	[a]10.2						
10					[a]19.4	[a]15.6						
11					[a]23.4	[a]15.6						
12					[a]27.2							
13					[a]27.2							
14					[a]24.4							
15												
16					[a]27.2							
17				[a]8.6	[a]27.2							
18				[a]8.6	[a]27.2							
19					[a]27.2							
20				[a]15.6	[a]27.2							
21				[a]21.4	[a]27.2							
22				[a]25.4	[a]27.2							
23				[a]24.4	[a]27.2							
24				[a]19.5	[a]25.8							
25				[a]17.0	[a]24.6							
26				[a]15.6	[a]23.4							
27				[a]15.2	[a]21.0							
28				[a]14.7	[a]25.8							
29				[a]13.8								
30				[a]13.4								
31				[a]12.9								

[a] Mean of a. m. and p. m. readings.

Daily discharge, in second-feet, of Escondido Mutual Water Co.'s canal near Nellie, Cal., for the years ending Sept. 30, 1897-1915—Continued.

Day.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.
1906-7.												
1			[a]13.4						10.2	5.5		
2			[a]14.2	[a]24.3					10.2	5.5		
3			[a]14.7	[a]24.3					10.2	5.5		
4			[a]15.2						8.6	5.5		
5			[a]16.6	[a]17.7					8.6	5.5		
6	3.1		[a]14.7	[b]21.4					8.6	5.5		
7	3.6		[a]14.2						8.6			
8	3.1		[a]13.4						8.6			
9	3.6		[a]14.7						10.2			
10	7.7		[a]14.7						10.2			
11	3.1		[a]15.6						10.2			
12	3.6		[a]18.5					4.25	8.6			
13	3.6		[a]20.4					4.25	8.6			
14	3.1							4.25	8.6			
15	3.1		25.4					4.25	8.6			
16	3.6		[a]24.3					5.5	8.6			
17	3.1		[a]24.3					5.5	8.6			
18	3.1		[a]24.3					5.5	8.6			
19	3.1		[a]22.4					6.95	8.6			
20	3.6		[a]20.4					6.95	8.6			
21	3.1		[a]19.0					6.95	7.7			
22	3.6		[a]16.6					6.95	7.7			
23	3.6		[a]16.6					6.95	7.7			
24			[a]16.6					7.7	7.7			
25			[a]16.6					7.7	7.7			
26			[b]17.5					8.6	6.95			
27			[a]19.4					8.6	6.95			
28		[a]9.0	[a]19.4					9.4	6.95			
29		[a]9.0	[a]24.3					9.4	6.95			
30		[a]14.2	[a]24.3					10.2	6.2			
31			19.4					10.2				
1907-8.												
1			8.6	[a]12.9	[a]12.0	[a]5.5	[a]12.0	[a]11.6	[a]7.7			
2			8.1	[a]12.4	[a]12.0	[a]5.5	[a]12.0	[a]12.0	[a]7.7			
3			8.1	[a]12.0		[a]5.5	[a]12.0	[a]12.0	[a]7.7			
4			8.1	[a]12.0			[a]12.0	[a]12.0	[a]7.7			
5			8.6	[a]11.8	[a]5.5		[a]12.0	[a]12.0				
6			8.6	[a]11.3	[a]5.5		[a]12.0	[a]12.0				
7			9.4	[a]10.6	[a]5.5	[a]5.5	[a]12.0	[a]12.0				
8			9.4	[a]10.2	[a]5.5	[a]5.5	[a]12.0	[a]11.1				
9			4.25	[a]10.2		[a]5.5	[a]12.0	[a]11.1				
10			8.6	[a]10.2.		[a]5.5	[a]12.0	[a]11.1				
11			9.4	[a]10.0	[a]5.5	[a]5.5	[a]12.0	[a]11 1				
12			9.4	[a]9.8	[a]5.5	[a]5.5	[a]12.0	[a]11.1				
13			9.4	[a]10.2	[a]5.5	[a]5.5	[a]12 0	[a]10.2				
14			9.4	[a]10.2	[a]5.5	[a]5.5	[a]12.0	[a]10.2				
15			10.2	[a]14.7	[a]5.5	[a]5.5	[a]12.0	[a]10.2				
16			9.4	[a]14.7	[a]5.5	[a]5.5	[a]12.0	[a]11 1				
17			9.8	[a]14.7	[a]5.5	[a]5.5	[a]12.0	[a]10.2				
18			9.4	[a]14.2	[a]5.5	[a]5.5	[a]12.0	[a]10.2				
19			10.2	[a]13.8	[a]5.5	[a]5.5	[a]12.0	[a]10.2				
20			10.2	[a]13.8	[a]5.5	[a]9.8	[a]12.0	[a]8.6				
21			10.2	[a]13.4	[a]5.5	[a]9.8	[a]12.0	[a]8.6				
22			[a]10.2	[a]12.9	[a]5.5	[a]9.8	[a]12.0	[a]8.6				
23			[a]10.2	[b]12.9	[a]5.5	[a]9.8	[a]12.0	[a]8.6				
24			[a]10.2		[a]5.5	[a]10.2	[a]12.0	[a]8.6				
25			[a]10.2		[a]5.5	[a]12.0	[a]12.0	[a]8.6				
26		9.0	[a]10.2		[a]5.5	[a]8.6	[a]12.0	[a]8.6				
27		9.0	[a]10.2		[a]5.5	[a]12.0	[a]12.0	[a]8.6				
28		9.0	[a]10.2		[a]5.5	[a]12.0	[a]12.0	[a]8.6				
29		8.6	[a]10.2	[a]12.0	[a]5.5	[a]12.0	[a]12.0	[a]8.6				
30		8.6	[a]13.4	[a]12.0		[a]12.0	[a]12.0	[a]8.6				
31			[a]12.9	[a]12.0		[a]12.0		[a]7.7				

[a] Mean of a. m. and p. m. readings.

[b] No flow in p. m.

Daily discharge, in second-feet, of Escondido Mutual Water Co.'s canal near Nellie, Cal., for the years ending Sept. 30, 1897–1915—Continued.

Day.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.
1908-9.												
1			6.2	6.2	23.4	19.4	17.5	10.2	10.2	2.55		
2			6.2	5.5	23.4	19.4	18.4	10.2	10.2	2.05		
3			6.95	6.2	23.4	19.4	18.4	10.2	10.2	2.05		
4			6.95	6.2		19.4	[a]16.6	10.2	8.6	2.55		
5			6.95	6.2	23.4	21.4	[a]18.4	10.2	7.7	2.55		
6			6.95	6.2	15.6	21.4	[a]19.0	10.2	6.95	2.55		
7			8.6	6.2	15.6	21.4	[a]18.4	10.2	6.95	2.05		
8			6.95	6.2		21.4	[a]19.4	10.2	6.95	2.05		
9			6.95	10.2	21.4	23.4	[a]19.0	10.2	6.2	2.05		
10			6.2	8.6	21.4	23.4	[a]19.0	10.2	6.2	2.05		
11			6.2	8.6		13.8	[a]18.4	10.2	6.2	2.05		
12			6.2	11.1		23.4	[a]18.4	10.2	6.2	2.05		
13			6.2	11.1		23.4	[a]18.4	10.2	6.2	2.05		
14			6.2	11.1		21.4	[a]10.2	10.2	6.2	2.05		
15			6.2	16.6		21.4	[a]10.2	10.2	6.2	2.05		
16			10.2	19.4		23.4	[a]10.2	10.2	6.2	2.05		
17			8.6	12.0		21.4	[a]10.2	10.2	6.2	2.05		
18			8.6	12.9			[a]10.2	10.2	6.2	2.05		
19			6.95	12.9			[a]10.2	10.2	6.2	2.05		
20			6.2	12.9			[a]10.2	10 2	5.85	2.05		
21			6.2	12.9			[a]10.2	10.2	5.85	2.05		
22			6.2				[a]10.2	10.2	5.5	2.05		
23			6.2				[a]10.2	10.2	4.9	2.05		
24		6.95	6.2			[a]11.2	[a]10.2	10.2	4.25	2.05		
25		6.95	6.2			14.7		10.2	4.25			
26			6.2		8.6	14.7	10.2	10.2	3.6			
27		6.2	6.2		12.0		10.2	10.2	3.6			
28		6.2	6.2	14.2	12.0		10.2	10.2	3.1			
29		6.2	6.2	19.4			10.2	10.2	3.1			
30		6.2	6.2	15.6		14.7	10.2	10.2	3.1			
31			6.2	15.6		15.6		10.2				
1909-10.												
1					11.7	17.3	6.4	7.5		1.2	1.2	
2					11.7	17.3	6.4	7 5	3.0	1.2	.8	
3					11.7	17.3	6.4	7.5	3.0	1.2	.8	
4					11.7		6.4	7.5	3.0	.8	.8	
5					11.7		6.4	7.5	3.0	.8	.8	
6					11.7		6.4	7.5	2.3	.8	.8	
7					11.7	17.3	6.4	7.5	2.3	.8	.8	
8				6.4	11.7	17.3	6.4	7.5	1.7	.8	1.2	
9				6.4	12.3	14.4	6.4	7.5	1.7	.8	1.2	
10				7.5	12.3	14.4	6.4	7.5	1.7	.8	1.2	
11				7.5	12.3	17.3	6.4	7.5	1.7	.8	1.2	
12				12.3	12.3	17.3	6.4	7.5	1.2	.8		
13				13.0	12.3	17.3	6.4	7.5	1.2	.8		
14				13.0	13.7	17.3	6.4	7.5	1.2	.8		
15				11.7	13.7	17.3	6.4	7.5	1.7	1.2		
16					15.8	17.3	6.4	7.5	2.3	1.2		
17				11.7	15.1	17.3	6.4	7.5	2.3	1.2		
18				11.7	16.5	17.3	6.4	7.5	2.3			
19				11.7	16.5	17.3	6.4	7.5	1.7			
20				11.7	17.3	17.3	6.4	7.5	1.7			
21				11.7	17.3	17.3	6.4	7.5	1.7			
22				11.7	17.3	17.3	6.4	5.4	1.7			
23				11.7	17.3	6.4	6.4	5.4	1.7			
24				11.7	17.3	6.4	6.4	5.4	1.7			
25				11.7	17.3	6.4	6.4	5.4	1.2			
26				11.7	17.3	6.4	7.5	5.4	1.2			
27				11.7	17.3	6.4	7.5	5.4	1.2			
28				11.7	17.3	6.4	7.5	4.6	1.2			
29				11.7		6.4	7.5	4.6	1.2			
30				11.7		6.4	7.5		1.2			
31				11.7		6.4						

[a] Mean of a. m. and p. m. readings.

Daily discharge, in second-feet, of Escondido Mutual Water Co.'s canal near Nellie Cal., for the years ending Sept. 30, 1897–1915—Continued.

Day.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.
1910-11.												
1			2.3	3.7			20.3	16.5				
2			2.3	3.7		20.3	20.3	15.1				
3			2.3	3.7		20.3	20.3	13.7				
4			2.3	3.7		19.5	20.3	13.7				
5			2.3	3.7		20.3	20.3	13.7				
6			2.3	3.7			20.3	13.7				
7			2.3	3.0		17.3	20.3	12.3				
8			2.3	3.0		20.3	20.3	11.0				
9			2.3			20.3	20.3	11.0				
10			2.3			20.3	20.3	9.8				
11			2.3			20.3	20.3	9.8				
12			2.3			20.3	20.3	8.6				
13			2.3			20.3	20.3	7.5				
14			2.6	12.3		20.3	20.3	8.6				
15			2.6		17.3	20.3	20.3	9.8				
16			2.6	12.3	19.5	20.3	20.3	8.6				
17			2.3	15.1	19.5	20.3	20.3	8.6				
18			2.3	17.3	19.5	20.3	20.3	8.6				
19			2.3	15.1	19.5	20.3	20.3	7.5				
20			3.0	13.7	19.5	20.3	20.3	7.5				
21			3.0	12.3	19.5	20.3	20.3	6.4				
22			3.7	11.0	19.5	20.3		5.4				
23			3.7	11.0	19.5	20.3	17.3	4.6				
24			3.7	11.0	19.5	20.3	19.5	4.6				
25			3.7	13.7	20.3	20.3	19.5					
26			3.7	17.3	20.3	20.3	19.5					
27			3.7	19.5	20.3	20.3	20.3					
28			3.7		20.3	20.3	20.3					
29			3.7			20.3	19.5					
30			3.7	13.7		20.3	18.0					
31				17.3		20.3						
1911-12.												
1				11.0	5.9	11.0	14.4	23.4	6.4			
2				12.3	5.4	11.0	14.4	24.2				
3				11.7	5.0	11.0	15.8	24.2				
4				11.0	4.6	11.7		24.2				
5				8.6	5.4	13.0	21.8	24.2				
6				8.6	5.4		22.6	24.2				
7				8.6	6.5		22.6	25.8				
8				8.6	7.5	15.1	22.6.	25.8				
9				8.6	7.5	18.0	24.2	24.2				
10				8.6	6.4		24.2	24.2				
11				11.0	6.4		25.8	24.2				
12				9.8	6.4			24.2				
13				7.5	5.4			24.2				
14				6.4	5.4			24.2				
15				6.4	5.4			24.2				
16				6.4	5.4			24.2				
17				5.4	5.4			22.6				
18				11.0	5.0			25.8				
19				7.5	4.8			25.8				
20				6.4	4.6	11.7		25.8				
21				6.4	4.1	13.7		25.8				
22				6.4	4.8	14.4		25.8				
23				5.4	4.6	14.4		25.8				
24				5.4	4.6	14.4		25.8				
25				5.4	4.1	14.4		25.8				
26				8.6	4.1	14.4		15.1				
27				8.6	4.6			12.3				
28				7.5	4.6	14.4		11.0				
29				7.5	4.6	14.4		8.6				
30				6.4		14.4	22.6	6.4				
31				5.9		14.4						

Daily discharge, in second-feet, of Escondido Mutual Water Co.'s canal near Nellie, Cal., for the years ending Sept. 30, 1897–1915—Continued.

Day.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.
1912–13.												
1	......	......	4.9	3.5	6.1	20.8	18.6	2.5	......	......	......	......
2	......	......	3.8	3.5	6.1	20.0	21.5	1.9	......	......	......	......
3	......	......	3.5	......	6.1	19.3	18.6	1.9	......	......	......	......
4	......	......	2.8	......	6.1	21.5	17.1	1.9	......	......	......	......
5	......	......	2.3	......	11.3	21.5	16.0	......	......	......	......	......
6	......	......	2.1	......	13.8	21.5	15.6	......	......	......	......	......
7	......	......	2.1	......	14.2	21.5	14.9	......	......	......	......	......
8	......	......	2.3	......	17.9	21.5	14.2	......	......	......	......	......
9	......	......	2.3	......	14.9	21.5	13.1	......	......	......	......	......
10	......	......	2.3	......	11.7	20.0	12.0	......	......	......	......	......
11	......	......	2.5	......	10.0	20.0	10.0	......	......	......	......	......
12	......	......	2.5	......	8.7	22.3	10.0	......	......	......	......	......
13	......	......	2.5	......	7.7	22.3	10.0	......	......	......	......	......
14	......	......	2.5	......	7.4	20.8	14.9	......	......	......	......	......
15	......	......	2.5	......	7.1	20.0	12.8	......	......	......	......	......
16	......	......	2.5	......	6.7	20.0	12.8	......	......	......	......	......
17	......	......	2.5	......	6.7	19.3	12.8	......	......	......	......	......
18	......	......	2.5	......	6.7	19.3	......	......	......	......	......	......
19	......	......	2.5	12.8	7.4	19.3	17.5	......	......	......	......	......
20	......	......	2.5	10.7	8.0	23.1	13.5	......	......	......	......	......
21	......	......	3.5	8.7	14.2	20.0	11.3	......	......	......	......	......
22	......	......	3.5	8.7	17.5	20.0	11.3	......	......	......	......	......
23	......	......	3.5	8.7	12.8	23.1	10.0	......	......	......	......	......
24	......	......	3.5	8.0	18.6	23.1	9.3	......	......	......	......	......
25	......	......	3.5	7.7	......	22.3	9.0	......	......	......	......	......
26	......	......	3.5	7.4	......	22.3	8.4	......	......	......	......	......
27	......	......	3.5	7.4	......	22.3	7.4	......	......	......	......	......
28	......	......	3.5	6.7	19.3	21.5	6.1	......	......	......	......	......
29	......	......	3.5	6.1	......	21.5	6.1	......	......	......	......	......
30	......	......	3.5	6.1	......	20.0	6.1	......	......	......	......	......
31	......	......	3.5	6.1	......	20.0	......	......	......	......	......	......
1913–14.												
1	......	......	......	7.5	36.6	......	36.6	24.2	8.6	......	......	......
2	......	......	......	6.4	36.6	......	36.6	24.2	9.8	......	......	......
3	......	......	......	5.9	40.4	......	36.6	29.7	9.8	......	......	......
4	......	......	......	5.4	36.6	24.2	[a] 15.2	29.7	7.5	......	......	......
5	......	......	2.8	5.0	33.5	30.4	18.0	29.0	6.9	......	......	......
6	......	......	2.8	4.6	30.4	38.1	12.3	27.4	7.5	......	......	......
7	......	......	2.8	4.1	28.2	42.7	12.3	24.2	[a] 11.1	......	......	......
8	......	......	2.6	3.7	25.8	42.7	12.3	19.5	15.8	......	......	......
9	......	......	2.3	3.7	24.2	42.7	12.3	18.0	10.4	......	......	......
10	......	......	2.3	3.7	22.6	30.4	12.3	17.6	8.6	......	......	......
11	......	......	2.3	3.7	21.8	30.4	12.3	16.5	7.5	......	......	......
12	......	......	2.3	3.7	21.1	38.1	12.3	15.8	6.4	......	......	......
13	......	......	2.3	3.7	18.0	38.1	12.3	15.8	5.9	......	......	......
14	......	......	2.6	3.7	17.2	38.1	12.3	18.7	......	......	......	......
15	......	......	2.6	7.5	16.5	38.1	12.3	18.0	......	......	......	......
16	......	......	2.6	15.1	15.8	38.1	[a] 15.9	16.5	......	......	......	......
17	......	......	2.6	24.2	19.5	35.1	18.0	15.8	......	......	......	......
18	......	......	2.6	18.0	21.1	33.5	16.5	14.4	......	......	......	......
19	......	......	2.6	39.7	......	33.5	15.8	13.7	......	......	......	......
20	......	......	3.7	24.2	......	32.0	15.1	12.3	......	......	......	......
21	......	......	3.7	18.0	......	30.4	9.8	11.7	......	......	......	......
22	......	......	5.4	12.3	......	30.4	......	11.0	......	......	......	......
23	......	......	7.5	13.7	......	30.4	12.3	11.0	......	......	......	......
24	......	......	6.9	13.7	......	33.5	7.5	11.0	......	......	......	......
25	......	......	7.5	25.8	......	33.5	12.3	11.0	......	......	......	......
26	......	......	7.5	30.4	......	36.6	12.3	11.0	......	......	......	......
27	......	......	6.4	......	......	36.6	12.3	10.4	......	......	......	......
28	......	......	6.4	......	......	36.6	11.0	9.8	......	......	......	......
29	......	......	5.9	......	......	36.6	12.3	9.2	......	......	......	......
30	......	......	12.3	......	......	36.6	12.3	8.6	......	......	......	......
31	......	......	9.8	33.5	......	36.6	......	8.6	......	......	......	......

[a] Mean of a. m. and p. m. readings.

Daily discharge, in second-feet, of Escondido Mutual Water Co.'s canal near Nellie, Cal., for the years ending Sept. 30, 1897–1915—Continued.

Day.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.
1914–15.												
1				6.7	24.2	33.5	16.5	9.8	6.4	22.6		
2			5.0	6.4	24.2	33.5	16.5	12.3	6.4	22.6		
3			3.5	6.2	24.2	33.5	16.5	6.4	6.4	15.1		
4			3.4	8.0	24.2	33.5	16.5	6.4	6.4	18.0		
5			4.1	9.2	29.0	33.5	16.5	6.4	6.4	19.5		
6			3.5	7.7	33.5	33.5	16.5	6.4	6.4	18.0		
7			3.7	7.7	33.5	33.5	16.5	6.4	6.4	18.0		
8			3.5	7.7	33.5	33.5	16.5	6.4	6.4	18.0		
9			3.5	10.1	33.5	33.5	16.5	6.4	9.8	13.7		
10			3.5	9.8	33.5	33.5	16.5	6.4	9.8	13.7		
11			5.6	9.8	33.5	13.7	16.5	6.4	9.8	13.7		
12			22.6	9.8	33.5	11.3	12.3	6.4	9.8	13.0		
13			10.4	9.8	33.5	11.3	16.5	6.4	9.8	13.0		
14			6.7	9.8	33.5	11.3	16.5	6.4	9.8	12.3		
15			5.6	9.8	33.5	11.3	13.7	6.4	9.8	12.3		
16			5.4	9.8	33.5	11.3	13.7	6.4	9.8	11.7		
17			10.7	9.8	33.5	7.5	13.7	6.4	9.8	11.0		
18			25.8	9.8	33.5	11.3	16.5	6.4	9.8	11.0		
19			19.5	9.8	33.5	11.3	16.5	6.4	9.8	10.4		
20			16.1	9.8	33.5	11.3	12.3	6.4	19.5	10.4		
21			16.5	9.8	33.5	11.3	16.5	6.4	19.5	10.1		
22			13.7	9.8	33.5	11.3	16.5	6.4	22.6	9.8		
23			12.0	24.2	33.5	11.3	16.5	6.4	22.6	9.5		
24			10.4	14.7	33.5	11.3	15.1	6.4	22.6	9.2		
25			8.6	32.7	33.5	11.3	15.1	6.4	22.6	8.6		
26			8.3	33.5	33.5	16.5	12.3	6.4	22.6	8.0		
27			9.2	21.8	33.5	16.5	12.3	6.4	21.8	8.6		
28			9.2	27.4	33.5	16.5	16.5	6.4	21.8	8.6		
29			7.7	33.5		16.5	16.5	6.4	22.6	8.0		
30			7.7	33.5		16.5	12.3	6.4	22.6			
31			7.5	33.5		16.5		6.4				

Monthly discharge of Escondido Mutual Water Co.'s canal near Nellie, Cal., for the years ending Sept. 30, 1896–1915.

Month.	Discharge in second-feet.		Run-off (total in acre-feet).
	Maximum.	Minimum.	
1896–7.			
October	12.0	0.85	159
November (29 days)	19.45	3.1	274
December	15.6	4.25	438
January (28 days)	35.05	6.2	997
February (23 days)	37.0	19.45	1,341
March (29 days)	40.85	5.5	1,424
April (25 days)	37.0	12.0	1,174
May (21 days)	8.6	2.05	210
June	.0	.0	0
July	.0	.0	0
August	.0	.0	0
September	.0	.0	0
The year	40.85	.0	6,017
1897–8.			
October	.0	.0	0
November	.0	.0	0
December (28 days)	12.0	3.1	392
January (29 days)	48.8	5.5	1,028
February	37.0	10.2	917
March	37.0	9.4	1,193
April (17 days)	13.8	7.7	351
May	.0	.0	0
June	.0	.0	0
July	.0	.0	0
August	.0	.0	0
September	.0	.0	0
The year	48.8	.0	3,881

Monthly discharge of Escondido Mutual Water Co.'s canal near Nellie, Cal., for the years ending Sept. 30, 1896–1915—Continued.

Month.	Discharge in second-feet.		Run-off (total in acre-feet).
	Maximum.	Minimum.	
1898–9.			
October	0.0	0.0	0
November	.0	.0	0
December	.0	.0	0
January (16 days)	6.95	3.6	158
February	35.05	3.6	608
March (30 days)	39.0	4.25	717
April (19 days)	12.9	4.25	282
May	.0	.0	0
June	.0	.0	0
July	.0	.0	0
August	.0	.0	0
September	.0	.0	0
The year	39.00	.0	1,765
1899–1900.			
October	.0	.0	0
November	.0	.0	0
December	.0	.0	0
January	21.45	4.9	498
February	7.3	3.6	351
March	15.6	3.9	356
April	25.4	3.1	438
May (16 days)	31.2	4.95	360
June	.0	.0	0
July	.0	.0	0
August	.0	.0	0
September	.0	.0	0
The year	31.2	.0	2,003
1900–1.			
October	.0	.0	0
November (15 days)	21.45	1.85	293
December (10 days)	3.6	3.1	66
January (28 days)	25.35	3.1	652
February (10 days)	33.1	12.0	542
March (23 days)	27.35	11.1	846
April (11 days)	20.5	14.7	396
May	.0	.0	0
June	.0	.0	0
July	.0	.0	0
August	.0	.0	0
September	.0	.0	0
The year	33.1	.0	2,795
1902–3.			
October	.0	.0	0
November (3 days)	6.5	2.5	26
December (4 days)	9.0	2.0	35
January	25.35	3.6	352
February	27.25	5.5	1,270
March	27.25	13.35	1,310
April (22 days)	27.25	5.5	1,014
May (9 days)	27.25	10.2	230
June	.0	.0	0
July	.0	.0	0
August	.0	.0	0
September	.0	.0	0
The year	27.25	.0	4,237

Monthly discharge of Escondido Mutual Water Co.'s canal near Nellie, Cal., for the years ending Sept. 30, 1896–1915—Continued.

Month.	Discharge in second-feet.		Run-off (total in acre-feet).
	Maximum.	Minimum.	
1904–5.			
October	0.0	0.0	0
November	.0	.0	0
December	.0	.0	0
January	.0	.0	0
February	.0	.0	0
March (28 days)	28.3	15.6	1,138
April	28.3	27.2	1,621
May (13 days)	27.25	15.6	676
June	.0	.0	0
July	.0	.0	0
August	.0	.0	0
September	.0	.0	0
The year	28.3	.0	3,435
1905–6.			
October	.0	.0	0
November	.0	.0	0
December	.0	.0	0
January (14 days)	25.35	8.6	448
February (27 days)	27.25	10.2	1,192
March (8 days)	27.25	10.2	282
April	.0	.0	0
May	.0	.0	0
June	.0	.0	0
July	.0	.0	0
August	.0	.0	0
September	.0	.0	0
The year	27.25	.0	1,922
1906–7.			
October (18 days)	7.7	3.1	128
November (3 days)	15.6	8.6	64
December (30 days)	25.35	12.0	1,055
January (4 days)	24.3	12.0	153
February	.0	.0	0
March	.0	.0	0
April	.0	.0	0
May (20 days)	10.2	4.25	278
June	10.2	6.2	504
July (6 days)	5.5	5.5	65
August	.0	.0	0
September	.0	.0	0
The year	25.35	.0	2,247
1907–8.			
October	.0	.0	0
November (5 days)	9.0	8.6	88
December	13.35	8.1	588
January (26 days)	14.7	9.8	612
February (25 days)	12.0	5.5	299
March (28 days)	12.0	5.5	432
April	12.0	12.0	714
May	12.0	7.7	622
June (4 days)	7.7	7.7	53
July	.0	.0	0
August	.0	.0	0
September	.0	.0	0
The year	14.7	.0	3,408

Monthly discharge of Escondido Mutual Water Co.'s canal near Nellie, Cal., for the years ending Sept. 30, 1896–1915—Continued.

Month.	Discharge in second-feet.		Run-off (total in acre-feet).
	Maximum.	Minimum.	
1908–9.			
October	0.0	0.0	0
November (6 days)	6.95	6.2	77
December	10.2	6.2	414
January (25 days)	19.45	5.5	544
February (11 days)	23.4	8.6	397
March (22 days)	23.4	9.4	852
April (29 days)	19.45	10.2	798
May	10.2	10.2	627
June	10.2	3.1	363
July (24 days)	2.55	2.05	101
August	.0	.0	0
September	.0	.0	0
The year	23.4	.0	4,173
1909–10.			
October	.0	.0	0
November	.0	.0	0
December	.0	.0	0
January (23 days)	13.0	6.4	502
February	17.3	11.7	797
March (28 days)	17.3	6.4	754
April	7.5	6.4	392
May (29 days)	7.5	4.6	395
June (29 days)	3.0	1.2	105
July (17 days)	1.2	.8	32
August (11 days)	1.2	.8	22
September	.0	.0	0
The year	17.3	.0	2,999
1910–11.			
October	.0	.0	0
November	.0	.0	0
December	3.7	2.3	166
January (23 days)	19.5	3.0	478
February (14 days)	20.3	17.3	543
March (29 days)	20.3	17.3	1,161
April (29 days)	20.3	17.3	1,151
May (24 days)	16.5	4.6	469
June	.0	.0	0
July	.0	.0	0
August	.0	.0	0
September	.0	.0	0
The year	20.3	.0	3,968
1911–12.			0
October	.0	.0	0
November	.0	.0	0
December	.0	.0	0
January	12.3	5.4	494
February	7.5	4.1	305
March (18 days)	18.0	11.0	487
April (11 days)	25.8	14.4	458
May (30 days)	25.8	6.4	1,332
June (1 day)	6.4	6.4	12
July	.0	.0	0
August	.0	.0	0
September	.0	.0	0
The year	25.8	.0	3,088

Monthly discharge of Escondido Mutual Water Co.'s canal near Nellie, Cal., for the years ending Sept. 30, 1896-1915—Continued.

Month.	Discharge in second-feet.		Run-off (total in acre-feet).
	Maximum.	Minimum.	
1912-13.			
October	0.0	0.0	0
November	.0	.0	0
December	4.9	2.1	182
January (15 days)	12.8	3.5	222
February (25 days)	19.3	6.1	530
March	23.1	19.3	1,294
April (29 days)	21.5	6.1	716
May (4 days)	2.5	1.9	16
June	.0	.0	0
July	.0	.0	0
August	.0	.0	0
September	.0	.0	0
The year	23.10	.0	2,960
1913-14.			
October	.0	.0	0
November	.0	.0	0
December (27 days)	12.3	2.3	240
January (27 days)	39.7	3.7	676
February (18 days)	40.4	15.8	924
March (28 days)	42.7	24.2	1,951
April (29 days)	18.0	7.5	891
May	29.7	8.6	1,020
June (13 days)	15.8	5.9	230
July	.0	.0	0
August	.0	.0	0
September	.0	.0	0
The year	42.7	.0	5,932
1914-15.			
October	.0	.0	0
November	.0	.0	0
December (30 days)	25.8	3.5	541
January	33.5	6.7	896
February	33.5	24.2	1,773
March	33.5	11.3	1,194
April	16.5	12.3	918
May	12.3	6.4	412
June	22.6	6.4	793
July	22.6	8.0	750
August	.0	.0	0
September	.0	.0	0
The year	33.5	.0	7,277

NOTE.—These tables supersede those previously published in water-supply papers. Discharge in columns headed "Maximum" or "Minimum" corresponds to the maximum or minimum stage recorded during month.

SANTA ANA RIVER BASIN.

SANTA ANA RIVER NEAR MENTONE, CAL.

Location.—In the SW. ¼ sec. 4, T. 1 S., R. 2 W., San Bernardino County, near mouth of canyon, one-fourth mile above Pacific Light & Power Corporation's plant, one-half mile above mouth of Deep Creek, and 3½ miles northeast of Mentone.

Drainage area.—189 square miles (measured on topographic map); 182 square miles at original site above Warm Spring Canyon.

Records available.—July 1, 1896, to September 30, 1915.

Gage.—Vertical staff fastened to a rock ledge on left bank one-fourth mile above power house; since October 1, 1914, read by E. Givens; prior to that date gage was just above ford, 1½ miles upstream. Several gages at approximately the same site but at independent datums have been used.

Discharge measurements.—Made from cable just above ford at upper gage or by wading.

Channel and control.—Composed of gravel and boulders; shifts during high water.

Extremes of discharge.—Maximum stage recorded during year, 8.4 feet at 8 a. m. February 10 and 11 (discharge determined from extension of rating curve, about 870 second-feet); minimum stage recorded, 5.0 feet September 23 to 30 (discharge, 1 second-foot).

1896–1914: Maximum stage January 1, 1910, when gage was washed out (crest height unknown; mean discharge for day estimated at 8,500 second-feet); minimum stage recorded, 2.3 feet during parts of every month from October, 1913, to January, 1914 (discharge, 0.6 second-foot).

Diversions.—The intake of the Pacific Light & Power Corporation's canal is at the Southern California Edison Co.'s plant No. 2, 2½ miles above the gage. The Greenspot pipe line diverts water for irrigation from the forebay of this canal at the Mentone power house. From the tailrace the water is carried across Santa Ana River and used for irrigation.

Regulation.—Water is stored on Bear Creek at Bear Valley reservoir. Southern California Edison Co.'s power plants Nos. 1 and 2 are 5¼ and 2¾ miles, respectively, above the Mentone plant of the Pacific Light & Power Corporation at the mouth of the canyon.

Accuracy.—Rating curve fairly well defined except for high stages. Gage read only once a day, usually to tenths. Results only fair.

Discharge measurements of Santa Ana River near Mentone, Cal., during the year ending Sept. 30, 1915.

[Made by F. C. Ebert.]

Date.	Gage height.	Discharge.	Date.	Gage height.	Discharge.	Date.	Gage height.	Discharge.
	Feet.	*Sec.-ft.*		*Feet.*	*Sec.-ft.*		*Feet.*	*Sec.-ft.*
Nov. 20	[a]1.80	1.7	Mar. 25	6.80	153	May 23	6.97	177
Dec. 23	[a]1.86	1.8	Apr. 8	6.72	115	June 28	6.59	91
Feb. 16	[b]6.77	154	15	6.73	125	July 15	6.45	73
26	[c]6.5	83	May 15	7.1	240	Aug. 12	5.83	11
Mar. 12	6.42	65						

[a] Old gage. [b] Old gage read 5.04 feet. [c] Old gage read 4.98 feet.

Daily discharge, in feet, of Santa Ana River near Mentone, Cal., for the year ending Sept. 30, 1915.

Day.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May,	June.	July.	Aug.	Sept.
1	1.7	1.7	1.8	1.8	198	100	121	198	198	100	29	4
2	1.7	1.7	1.8	1.8	121	100	144	260	228	100	29	4
3	1.7	1.7	1.8	1.8	121	100	144	198	228	100	29	4
4	1.7	1.7	1.8	1.8	121	100	170	198	198	100	29	4
5	1.7	1.7	1.8	1.8	121	100	170	198	170	100	29	4
6	1.7	1.7	1.8	1.8	121	100	144	198	170	100	21	3
7	1.7	1.7	1.8	1.8	121	64	121	198	170	100	21	3
8	1.7	1.7	1.8	1.8	121	64	121	198	170	100	21	3
9	1.7	1.7	1.8	1.8	144	64	121	198	170	100	21	2.5
10	1.7	1.7	1.8	1.8	870	64	121	228	170	100	18	2.5
11	1.7	1.7	3.0	1.8	870	64	144	228	170	100	18	2.5
12	1.7	1.7	1.8	1.8	510	64	170	260	170	100	18	2.5
13	1.7	1.7	1.8	1.8	510	64	170	295	144	100	18	2
14	1.7	1.7	1.8	1.8	510	64	170	260	144	81	18	2
15	1.7	1.7	1.8	1.8	144	64	144	260	144	72	18	2
16	1.7	1.7	1.8	46	144	64	144	228	144	72	15	2
17	1.7	1.7	1.8	1.8	144	100	144	260	144	64	15	2
18	1.7	1.7	1.8	1.8	100	100	144	260	144	64	15	2
19	1.7	1.7	1.8	1.8	100	100	170	260	144	64	15	2
20	1.7	1.7	1.8	1.8	100	100	170	260	121	64	10	1.5
21	1.7	1.7	1.8	1.8	100	100	228	260	121	57	5.5	1.5
22	1.7	1.7	3.0	1.8	100	100	170	260	121	57	5.5	1.5
23	1.7	1.7	1.8	1.8	100	144	170	260	121	50	5.5	1
24	1.7	1.7	1.8	1.8	100	144	170	198	121	64	5.5	1
25	1.7	1.7	1.8	1.8	100	170	170	198	121	64	5.5	1
26	1.7	1.7	1.8	1.8	100	144	170	198	121	57	5.5	1
27	1.7	1.7	1.8	1.8	100	121	170	198	121	50	5.5	1
28	1.7	1.7	1.8	1.8	100	121	170	198	100	38	5.5	1
29	1.7	1.7	1.8	330	......	198	228	198	100	38	5	1
30	1.7	1.7	1.8	198	......	170	198	198	100	38	5	1
31	1.7	......	1.8	198	......	144	......	198	......	38	4	......

NOTE.—Discharge determined as follows: Oct. 1 to Jan. 28, estimated from discharge measurements; Jan. 29 to Sept. 30, from a fairly well defined rating curve.

Monthly discharge of Santa Ana River near Mentone, Cal., for the year ending Sept. 30, 1915.

Month.	Discharge in second-feet.			Run-off (total in acre-feet).	Accuracy.
	Maximum.	Minimum.	Mean.		
October	1.7	1.7	1.70	105	D.
November	1.7	1.7	1.70	101	D.
December	3.0	1.8	1.88	116	D.
January	330	1.8	26.5	1,630	C.
February	870	100	214	11,900	C.
March	198	64	103	6,330	C.
April	228	121	160	9,520	C.
May	295	198	226	13,900	C.
June	228	100	150	8,930	C.
July	100	38	75.2	4,620	C.
August	29	4.0	15.0	922	C.
September	4	1.0	2.18	130	D.
The year	870	1.0	80.3	58,200	

Combined daily discharge, in second-feet, of Santa Ana River and Pacific Light & Power Corporation's canal including Greenspot pipe line near Mentone, Cal., for the year ending Sept. 30. 1915.

Day.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.
1	67	48	43	47	279	172	204	273	283	185	115	89
2	78	48	47	47	202	172	228	335	313	185	115	89
3	78	48	43	47	202	172	228	273	313	185	115	89
4	57	46	47	66	202	163	253	273	283	185	115	89
5	57	46	47	47	202	168	253	273	255	185	115	89
6	57	46	43	47	202	168	227	273	255	185	107	88
7	57	46	43	45	202	138	204	273	255	185	107	88
8	62	46	43	47	202	132	204	273	255	185	107	83
9	55	48	43	47	225	129	204	273	255	185	107	82
10	55	59	43	45	951	144	204	303	255	185	104	82
11	55	59	44	45	936	144	227	312	255	185	104	82
12	55	52	47	45	571	144	254	339	255	185	104	82
13	62	52	43	45	571	144	254	379	229	185	104	82
14	62	52	43	45	582	144	256	344	229	166	104	82
15	62	48	43	47	216	144	230	344	229	157	104	82
16	62	46	43	46	216	144	230	312	229	157	101	82
17	62	48	76	45	216	180	230	344	229	149	99	82
18	62	46	70	45	172	180	230	344	229	149	99	82
19	57	46	61	47	172	180	256	344	229	149	99	78
20	50	48	56	45	172	180	256	344	206	149	94	78
21	51	46	56	49	166	180	276	344	206	142	90	72
22	47	48	60	59	166	181	256	344	206	142	90	72
23	58	48	59	49	166	225	256	344	206	135	90	71
24	58	45	54	47	166	228	254	282	206	149	90	71
25	58	45	49	78	172	254	254	282	206	150	90	77
26	58	44	49	59	172	228	254	282	206	143	90	82
27	58	45	54	54	172	204	245	283	206	136	90	84
28	58	47	45	78	166	204	245	283	185	124	90	84
29	58	47	45	406	......	282	303	283	185	124	90	76
30	58	43	45	274	......	254	273	283	185	124	90	70
31	57	......	41	279	......	228	......	283	......	124	89	......

NOTE.—See page 95 for table of daily discharge of Pacific Light & Power Corporation's canal near Mentone and page 96 for that of Greenspot pipe line.

Combined monthly discharge of Santa Ana River and Pacific Light & Power Corporation's canal, including Greenspot pipe line, near Mentone, Cal., for the year ending Sept. 30, 1915.

Month.	Discharge in second-feet.			Run-off (total in acre-feet).
	Maximum.	Minimum.	Mean.	
October	78	47	59.1	3,630
November	59	43	47.9	2,850
December	76	41	49.2	3,030
January	406	45	76.5	4,700
February	951	166	287	15,900
March	282	129	181	11,100
April	303	204	242	14,400
May	379	273	307	18,900
June	313	185	235	14,000
July	185	124	160	9,840
August	115	89	100	6,150
September	89	70	81.3	4,840
The year	951	41	151	109,000

NOTE.—See page 96 for table of monthly discharge of Pacific Light & Power Corporation's canal, and page 97 for that of Greenspot pipe line.

PACIFIC LIGHT & POWER CORPORATION'S CANAL AND GREENSPOT PIPE LINE NEAR MENTONE, CAL.

Location.—At tailrace of Pacific Light & Power Corporation's plant at mouth of canyon, 2¾ miles below intake on Santa Ana River, and about 3 miles northeast of Mentone, San Bernardino County.

Records available.—1896 to September 30, 1915.

Gage.—Hook gage at weir on right bank of Santa Ana River about 300 feet west of power house.

Discharge.—Determined from gage heights which give head on 10-foot rectangular weir.

Extremes of discharge.—1896–1915: Maximum mean daily discharge recorded, 97 second-feet March 16, 1905; no flow during periods in nearly every year.

Diversions.—Water diverted from the forebay by the Greenspot pipe line must be added to give total flow of canal. The pipe line was put in operation September 7, 1911.

Accuracy.—Results excellent.

The intake of the Pacific Light & Power Corporation's canal is at Southern California Edison Co.'s power plant No. 2, 2¾ miles above the Mentone plant of the corporation at the mouth of the canyon. All the water, except that taken by the Greenspot pipe line, is first used for develpoment of power; after it leaves the Mentone power house, it is conducted across Santa Ana River in a flume and discharged into a lined canal, from which it is distributed for irrigation. Before it enters the irrigation canal it passes through three power plants.

Daily discharge, in second-feet, of Pacific Light & Power Corporation's canal near Mentone, Cal., for the year ending Sept. 30, 1915.

Day.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.
1	59	41	37	43	79	70	79	70	79	79	79	79
2	70	41	41	43	79	70	79	70	79	79	79	79
3	70	41	37	43	79	70	79	70	79	79	79	79
4	50	39	41	62	79	59	79	70	79	79	79	79
5	50	39	41	43	79	64	79	70	79	79	79	79
6	50	39	37	43	79	64	79	70	79	79	79	79
7	50	39	37	41	79	70	79	70	79	79	79	79
8	55	39	37	43	79	64	79	70	79	79	79	74
9	50	41	37	43	79	64	79	70	79	79	79	74
10	50	52	37	41	79	79	79	70	79	79	79	74
11	50	52	37	41	64	79	79	79	79	79	79	74
12	50	45	41	41	59	79	79	74	79	79	79	74
13	55	45	37	41	59	79	79	79	79	79	79	74
14	55	45	37	41	70	79	79	79	79	79	79	74
15	55	41	37	43	70	79	79	79	79	79	79	74
16	55	39	37	0	70	79	79	79	79	79	79	74
17	55	41	70	41	70	79	79	79	79	79	79	74
18	55	39	64	41	70	79	79	79	79	79	79	74
19	50	39	55	43	70	79	79	79	79	79	79	70
20	45	41	50	41	70	79	79	79	79	79	79	70
21	45	39	50	45	64	79	41	79	79	79	79	64
22	41	41	55	55	64	79	79	79	79	79	79	64
23	50	41	55	45	64	79	79	79	79	79	79	64
24	50	37	50	43	64	79	79	79	79	79	79	64
25	50	37	45	74	70	79	79	79	79	79	79	70
26	50	39	45	55	70	79	79	79	79	79	79	74
27	50	39	50	50	70	79	70	79	79	79	79	74
28	50	41	41	74	64	79	70	79	79	79	79	74
29	50	41	41	74	......	79	70	79	79	79	79	70
30	50	37	41	74	......	79	70	79	79	79	79	64
31	50	......	37	79	......	79	......	79	......	79	79	......

Monthly discharge of Pacific Light & Power Corporation's canal near Mentone, Cal., for the year ending Sept. 30, 1915.

Month.	Discharge in second-feet.			Run-off (total in acre-feet).
	Maximum.	Minimum.	Mean.	
October	70	41	52.1	3,200
November	52	37	41.0	2,440
December	70	37	43.8	2,690
January	79	0	47.9	2,950
February	79	59	71.1	3,950
March	79	59	75.3	4,630
April	79	41	76.5	4,550
May	79	70	75.9	4,670
June	79	79	79.0	4,700
July	79	79	79.0	4,860
August	79	79	79.0	4,860
September	79	64	73.0	4,340
The year	79	0	66.1	47,800

Daily discharge, in second-feet, of Greenspot pipe line near Mentone, Cal., for the year ending Sept. 30, 1915.

Day.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.
1	6.0	5.0	4.0	2.0	2.0	2.0	4.5	5.0	6.0	6.0	7.0	6.0
2	6.0	5.0	4.0	2.0	2.0	2.0	4.5	5.0	6.0	6.0	7.0	6.0
3	6.0	5.0	4.0	2.0	2.0	2.0	4.5	5.0	6.0	6.0	7.0	6.0
4	5.0	5.0	4.0	2.0	2.0	4.0	4.0	5.0	6.0	6.0	7.0	6.0
5	5.0	5.0	4.0	2.0	2.0	4.0	4.0	5.0	6.0	6.0	7.0	6.0
6	5.0	5.0	4.0	2.0	2.0	4.0	4.0	5.0	6.0	6.0	7.0	6.0
7	5.0	5.0	4.0	2.0	2.0	4.0	4.0	5.0	6.0	6.0	7.0	6.0
8	5.0	5.0	4.0	2.0	2.0	4.0	4.0	5.0	6.0	6.0	7.0	6.0
9	3.0	5.0	4.0	2.0	2.0	1.0	4.0	5.0	6.0	6.0	7.0	6.0
10	3.0	5.0	4.0	2.0	2.0	1.0	4.0	5.0	6.0	6.0	7.0	6.0
11	3.0	5.0	4.0	2.0	2.0	1.0	4.0	5.0	6.0	6.0	7.0	6.0
12	3.0	5.0	4.0	2.0	2.0	1.0	5.0	5.0	6.0	6.0	7.0	6.0
13	5.0	5.0	4.0	2.0	2.0	1.0	5.0	5.0	6.0	6.0	7.0	6.0
14	5.0	5.0	4.0	2.0	2.0	1.0	7.0	5.0	6.0	6.0	7.0	6.0
15	5.0	5.0	4.0	2.0	2.0	1.0	7.0	5.0	6.0	6.0	7.0	6.0
16	5.0	5.0	4.0	0.0	2.0	1.0	7.0	5.0	6.0	6.0	7.0	6.0
17	5.0	5.0	4.0	2.0	2.0	1.0	7.0	5.0	6.0	6.0	5.3	6.0
18	5.0	5.0	4.0	2.0	2.0	1.0	7.0	5.0	6.0	6.0	5.3	6.0
19	5.0	5.0	4.0	2.0	2.0	1.0	7.0	5.0	6.0	6.0	5.3	6.0
20	3.0	5.0	4.0	2.0	2.0	1.0	7.0	5.0	6.0	6.0	5.3	6.0
21	4.0	5.0	4.0	2.0	2.0	1.0	7.0	5.0	6.0	6.0	5.3	6.0
22	4.0	5.0	2.0	2.0	2.0	2.0	7.0	5.0	6.0	6.0	5.3	6.0
23	6.0	5.0	2.0	2.0	2.0	2.0	7.0	5.0	6.0	6.0	6.0	6.0
24	6.0	6.0	2.0	2.0	2.0	4.5	5.0	5.0	6.0	6.0	6.0	6.0
25	6.0	6.0	2.0	2.0	2.0	4.5	5.0	5.0	6.0	7.0	6.0	6.0
26	6.0	3.0	2.0	2.0	2.0	4.5	5.0	5.0	6.0	7.0	6.0	7.0
27	6.0	4.0	2.0	2.0	2.0	4.5	5.0	6.0	6.0	7.0	6.0	8.5
28	6.0	4.0	2.0	2.0	2.0	4.5	5.0	6.0	6.0	7.0	6.0	8.5
29	6.0	4.0	2.0	2.0	....	4.5	5.0	6.0	6.0	7.0	6.0	5.0
30	6.0	4.0	2.0	2.0	....	4.5	5.0	6.0	6.0	7.0	6.0	5.0
31	5.0	....	2.0	2.0	....	4.5	....	6.0	....	7.0	6.0	....

Monthly discharge of Greenspot pipe line near Mentone, Cal., for the year ending Sept. 30, 1915.

Month.	Discharge in second-feet.			Run-off (total in acre-feet).
	Maximum.	Minimum.	Mean.	
October	6.0	3.0	4.97	306
November	6.0	3.0	4.87	290
December	4.0	2.0	3.35	206
January	2.0	.0	1.94	119
February	2.0	2.0	2.00	111
March	4.5	1.0	2.55	157
April	7.0	4.0	5.35	318
May	6.0	5.0	5.16	317
June	6.0	6.0	6.00	357
July	7.0	6.0	6.23	383
August	7.0	5.3	6.38	392
September	8.5	5.0	6.13	365
The year	8.5	.0	4.59	3,320

MILL CREEK AT FOREST HOME,[1] CAL.

Location.—In the NW. ¼ NE. ¼ sec. 13, T 1 S., R. 1 W., at Forest Home, San Bernardino County, about 2½ miles below Falls Creek, 4 miles above Mountain Home Creek, and 14 miles east of Redlands.

Drainage area.—Not measured.

Records available.—September 23, 1903, to September 30, 1915.

Discharge.—Determined by combining results of current-meter measurements in power canal with flow over diverting dam. The flow over the diverting dam is only roughly determined and no report is made when total discharge exceeds 100 second-feet.

Extremes of discharge.—1903–1915: Maximum mean daily discharge, 368 second-feet February 20, 1914; minimum mean daily discharge, 7.0 second-feet November 19 and 20, 1904.

Diversions.—None.

Regulation.—None.

Accuracy.—Daily discharge is mean of two observations recorded every day at 6 a. m. and 6 p. m. Results good for periods in which total flow of creek is diverted into power canal; subject to error for higher stages.

Cooperation.—Record furnished by Southern California Edison Co., through H. W. Dennis, constructing engineer.

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[1] "Akers Camp" on map of San Gorgonio quadrangle, U. S. Geological Survey.

Daily discharge, in second-feet, of Mill Creek at Forest Home, Cal., for the year ending Sept. 30, 1915.

Day.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.
1	18.1	16.0	14.8	14.6	19.5	30	40	54	144	87	42	28
2	18.6	15.9	14.6	14.7	21	30	41	54	150	84	39	29
3	22	15.7	14.8	14.6	20	30	43	54	150	87	38	29
4	18.8	15.5	14.7	14.7	19.2	30	48	56	144	87	40	28
5	18.6	15.4	14.7	14.6	18.2	30	72	54	154	80	40	28
6	18.4	15.4	14.5	14.6	17.8	30	52	54	144	82	38	28
7	18.1	15.4	14.5	14.5	17.9	30	52	54	144	74	38	27
8	17.8	15.4	14.6	14.3	17.9	30	50	54	124	72	38	27
9	17.5	16.0	14.4	14.3	34	30	50	57	124	70	38	27
10	17.4	19.5	14.4	14.3	131	30	52	61	130	67	37	27
11	17.3	17.3	14.9	14.2	40	30	52	72	124	64	36	27
12	16.9	16.2	14.6	14.2	30	30	54	80	124	62	34	27
13	16.8	16.1	14.7	14.2	29	30	54	84	124	58	33	27
14	16.5	15.9	14.7	14.2	26	30	54	87	109	55	36	27
15	16.5	15.8	14.6	14.4	28	31	56	90	104	54	33	27
16	16.5	15.8	14.5	13.5	30	32	50	86	113	54	32	26
17	16.4	15.7	21	13.6	32	32	54	108	104	52	32	26
18	16.3	15.5	17.6	13.9	32	33	54	129	102	52	31	25
19	16.2	15.4	15.6	13.8	31	33	54	84	106	52	30	25
20	16.3	15.4	15.0	13.8	31	36	54	84	91	51	30	25
21	17.1	15.3	14.7	14.1	30	36	56	94	102	50	29	24
22	17.0	15.3	16.2	15.1	30	37	56	104	102	50	29	22
23	16.6	19.0	15.4	14.8	30	48	54	99	97	84	29	24
24	16.2	15.1	15.1	15.1	30	39	54	99	89	54	29	24
25	16.2	14.9	14.8	17.3	30	40	56	109	92	50	29	25
26	15.8	15.0	14.9	14.7	30	40	56	114	92	50	30	26
27	16.0	15.0	14.8	14.4	30	40	56	124	87	54	30	25
28	15.8	14.8	14.8	17.7	30	40	57	124	84	55	29	24
29	15.8	14.9	14.6	33	......	40	60	152	90	48	29	24
30	19.0	14.9	14.5	17.1	......	40	56	144	87	45	28	24
31	16.3	......	14.5	18.2	......	40	......	144	......	44	28	......

NOTE.—Dec. 9 and 10, gage read in morning only; Feb. 11, in evening only; Aug. 10 and 18, no record; discharge interpolated by engineers of the U. S. Geological Survey.

Monthly discharge of Mill Creek at Forest Home, Cal., for the year ending Sept. 30, 1915.

Month.	Discharge in second-feet.			Run-off (total in acre-feet).
	Maximum.	Minimum.	Mean.	
October	22	15.8	17.2	1,060
November	19.5	14.8	15.8	940
December	21	14.4	15.1	928
January	33	13.5	15.4	947
February	131	17.8	30.9	1,720
March	48	30	34.1	2,100
April	72	40	53.2	3,170
May	152	54	89.1	5,480
June	154	84	114	6,780
July	87	44	62.2	3,820
August	42	28	33.4	2,050
September	29	22	26.1	1,550
The year	154	13.5	42.2	30,500

NOTE.—Monthly and yearly discharge computed by engineers of the U. S. Geological Survey.

LYTLE CREEK NEAR SAN BERNARDINO, CAL.

Location.—In the NW. ¼ sec. 25, T. 2 N., R. 6 W., at Southern California Edison Co.'s diversion dam, below junction of North and Middle forks of Lytle Creek, in Angeles National Forest, about 3 miles above mouth of canyon, and 14 miles northwest of San Bernardino, San Bernardino County.

Drainage area.—Not measured.

Records available.—September 18, 1904, to September 30, 1915.

Gage.—Watson water-stage recorder in pool above weir in power canal.

Discharge.—Computed by combining flow in power canal with flow over diverting dam; discharge of power canal is measured near intake by an 8-foot steel plate rectangular weir; flow over diverting dam is estimated.

Extremes of discharge.—1904–1915: Maximum mean daily discharge reported, 1,260 second-feet January 18, 1914; minimum mean daily discharge, 5.1 second-feet September 30 and October 3, 1904.

Diversions.—No information.

Regulation.—No information.

Accuracy.—Daily discharge is mean of two observations recorded every day at 6 a. m. and 6 p. m. Results are good for periods during which total flow of creek is diverted into power canal; above 23 second-feet (capacity of canal) they are subject to error.

Cooperation.—Daily-discharge record furnished by Southern California Edison Co. through H. W. Dennis, construction engineer.

Daily discharge in second-feet of Lytle Creek near San Bernardino, Cal., for the year ending Sept. 30, 1915.

Day.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June.	July.	Aug.	Sept.
1	36	36	32	33	63	63	47	43	42	42	45	45
2	36	35	32	33	372	63	47	43	42	42	45	45
3	36	34	32	31	82	63	47	43	42	42	45	45
4	36	34	32	31	53	63	47	43	42	42	45	45
5	36	34	32	31	53	63	47	43	42	42	45	45
6	36	34	32	31	53	63	47	43	42	42	45	45
7	36	34	32	31	53	63	47	43	42	42	45	45
8	36	34	32	31	53	63	47	43	42	42	45	45
9	36	34	32	31	343	63	47	43	42	41	45	45
10	36	34	32	31	253	63	47	43	42	42	45	45
11	36	34	32	30	263	63	45	43	42	44	45	45
12	36	34	32	30	93	63	43	43	42	44	45	45
13	36	34	32	30	98	63	43	43	42	44	45	45
14	36	34	32	30	93	63	43	43	42	45	45	45
15	36	34	32	29	78	63	43	43	42	44	45	45
16	36	34	32	27	73	63	43	43	42	44	45	45
17	36	34	47	27	73	63	43	43	42	45	45	45
18	36	34	37	26	73	63	43	43	42	45	45	45
19	36	34	35	25	73	63	43	43	42	45	45	43
20	36	34	37	25	63	47	42	43	42	45	45	42
21	36	34	39	25	63	47	42	43	42	45	45	41
22	36	34	39	27	63	47	42	43	42	45	45	41
23	36	34	39	24	63	47	42	43	42	45	45	41
24	36	33	37	24	63	47	42	43	42	45	45	43
25	36	32	35	30	78	47	42	42	42	44	45	44
26	36	32	35	28	78	47	42	42	42	45	45	44
27	36	32	35	26	58	47	43	42	42	45	45	43
28	36	32	35	43	53	47	43	42	42	45	45	42
29	36	32	35	323	....	47	43	42	42	45	45	41
30	36	32	34	123	....	47	43	42	42	45	45	41
31	36	....	33	83	....	47	....	42	....	45	45	....

Monthly discharge of Lytle Creek near San Bernardino, Cal., for the year ending Sept. 30, 1915.

Month.	Discharge in second-feet.			Run-off (total in acre-feet).
	Maximum.	Minimum.	Mean.	
October	36	36	36	2,210
November	36	32	33.7	2,010
December	47	32	34.3	2,110
January	323	24	43.5	2,670
February	372	53	103	5,720
March	63	47	56.8	3,490
April	47	42	44.2	2,630
May	43	42	42.8	2,630
June	42	42	42.0	2,500
July	45	41	43.8	2,690
August	45	45	45.0	2,770
September	45	41	43.9	2,610
The year	372	24	47.0	34,000

NOTE.—Monthly and yearly discharge computed by engineers of the U. S. Geological Survey.

SAN ANTONIO CREEK NEAR UPLAND, CAL.

LOCATION.—In the SW. ¼ sec. 36, T. 2 N., R. 8 W., below Pacific Light & Power Corporation's power house, about 4 miles above mouth of canyon, and 8 miles northwest of Upland, San Bernardino County.

DRAINAGE AREA.—Not measured.

RECORDS AVAILABLE.—March 11, 1901, to September 30, 1915.

DISCHARGE.—Determined from gage-height record obtained at 10-foot rectangular weir in tailrace; excess water flowing over diverting dam is estimated.

EXTREMES OF DISCHARGE.—1901–1915: Maximum mean daily discharge, 607 second-feet February 21, 1914; minimum mean daily discharge, 3.4 second feet February 29, 1904.

DIVERSIONS.—No information.

REGULATION.—No information.

ACCURACY.—Capacity of power canal is about 21 second-feet. Results excellent when flow of creek does not exceed capacity of canal.

COOPERATION.—Daily discharge record furnished by Pacific Light & Power Corporation, through H. A. Barre, chief engineer.

Daily discharge, in second-feet, of San Antonio Creek near Upland, Cal., for the years ending Sept. 30, 1913 and 1915.

Day.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.
1912-13.												
1	9.6	9.0	8.7	8.7	7.1	10.0	10.0	16.0	15.1	10.6	8.7	7.1
2	9.6	8.6	8.7	6.5	7.1	9.5	10.8	16.0	15.1	10.4	8.4	7.1
3	9.0	8.6	8.7	6.5	7.1	9.5	10.8	16.0	15.0	10.4	8.4	7.2
4	11.0	8.6	8.7	6.5	7.1	9.0	10.8	16.4	14.5	10.2	8.3	7.1
5	11.0	8.6	8.7	6.5	7.1	9.0	11.0	16.4	14.5	10.2	8.3	7.0
6	11.0	8.6	8.7	6.5	7.1	9.0	11.7	16.4	14.3	10.2	8.3	7.0
7	10.0	8.6	8.7	6.8	7.1	9.0	11.9	16.4	14.3	9.0	8.0	7.0
8	9.5	8.6	8.7	6.8	11.0	9.0	12.5	16.4	14.3	10.2	8.0	7.0
9	9.5	8.6	8.7	6.8	8.7	9.0	12.7	16.0	13.7	9.9	8.3	6.9
10	9.5	8.6	8.7	6.8	8.2	9.5	12.7	16.0	13.4	9.9	8.3	7.0
11	9.5	8.6	8.7	6.8	8.2	9.5	13.6	15.4	13.4	9.9	8.2	7.0
12	9.5	8.6	8.7	6.8	7.8	9.5	15.0	15.4	13.2	9.9	8.0	7.0
13	9.5	8.6	8.7	6.8	7.8	9.5	15.0	15.2	13.2	9.1	7.6	6.8
14	9.0	8.6	8.7	6.8	7.8	9.5	15,0	15.0	12.9	9.4	7.6	7.0
15	9.0	8.6	8.7	6.8	7.8	9.5	16.2	14.5	12.9	9.4	7.6	6.8
16	9.0	8.6	8.7	9.6	7.8	9.5	16.9	14.5	12.4	8.1	7.6	7.0
17	9.0	8.6	8.7	9.6	7.6	9.5	16.9	14.0	12.4	8.1	7.6	6.8
18	9.0	8.6	8.7	7.6	7.6	9.5	16,9	14.0	12.4	8.8	7.5	6.5
19	9.0	8.6	8.7	7.6	7.6	9.5	17.4	13.5	12.0	8.8	7.5	6.8
20	9.0	8.6	8.7	7.6	7.6	9.5	17.4	13.5	12.0	8.8	7.6	6.8
21	9.0	8.7	8.7	7.6	7.6	9.5	16.9	13.0	11.7	8.9	7.5	6.8
22	9.0	8.7	8.7	7.6	7.6	9.5	16.9	13.0	11.7	8.7	7.5	6.7
23	9.0	8.7	8.7	7.6	8.7	10.0	16.9	13.0	11.7	8.7	7.4	6.8
24	9.0	8.7	8.7	7.6	11.0	10.0	16.9	14.3	11.4	8.8	7.4	6.7
25	9.0	8.7	8.7	7.1	12.5	10.0	16.5	15.1	11.4	9.2	7.5	6.7
26	9.0	8.7	8.7	7.1	12.3	10.0	16.5	15.6	11.4	9.2	7.4	6.7
27	9.0	8.7	8.7	7.1	10.9	10.0	16.5	15.6	11.4	9.2	7.4	6.7
28	9.0	8.7	8.7	7.1	10.9	10.0	16.0	16.0	11.4	9.0	7.4	6.7
29	9.0	8.7	8.7	7.1	....	10.0	16.0	15.6	11.1	8.7	7.1	6.7
30	9.0	8.7	8.7	7.1	....	10.0	16.0	15.6	11.1	8.7	7.2	6.7
31	9.0	....	8.7	7.1	....	10.0	....	15.6	....	8.7	7.1	....
1914-15.												
1	14.5	12.4	10.8	10.9	18.0	50	31	43	43	33	23	19.1
2	14.3	12.4	10.8	10.9	23	50	35	46	45	33	22	19.1
3	15.3	12.4	10.8	10.9	29	50	35	46	43	33	22	19.1
4	13.9	12.1	10.8	10.9	25	50	35	46	43	33	22	18.6
5	13.1	12.1	10.8	10.9	23	50	35	46	43	33	22	18.6
6	14.3	12.1	10.8	10.9	23	50	35	46	43	31	22	18.6
7	13.9	12.1	10.8	10.9	21	54	35	46	43	31	22	18.3
8	13.9	11.8	10.8	10.9	21	53	35	46	43	31	21	18.0
9	13.9	11.8	10.5	10.9	22	53	35	43	43	31	21	17.7
10	13.9	11.8	10.5	10.9	118	49	35	43	43	29	21	17.7
11	13.9	12.1	10.5	10.9	108	49	35	43	41	29	21	17.4
12	13.2	12.1	10.8	10.9	108	49	35	43	41	27	21	17.1
13	13.2	11.8	10.8	10.3	108	47	35	43	41	27	19.6	17.1
14	13.2	11.8	10.5	10.3	99	47	35	43	39	27	19.6	17.1
15	13.2	11.8	10.5	9.8	79	45	35	43	39	27	19.6	17.1
16	12.9	11.4	10.3	10.3	79	45	35	43	39	27	19.6	16.7
17	12.9	11.4	13.6	9.8	79	43	35	43	39	27	19.6	16.0
18	12.9	11.0	12.3	9.6	69	39	35	43	37	26	19.6	16.0
19	12.6	11.0	10.9	9.8	69	39	35	47	37	26	19.6	14.7
20	12.6	11.0	10.5	9.8	69	39	35	47	37	26	19.1	14.3
21	12.6	11.0	10.9	9.6	65	39	35	47	37	26	19.1	15.2
22	12.1	11.0	10.9	10.3	65	35	35	45	37	25	19.1	15.2
23	12.6	10.8	10.5	9.8	65	35	35	45	37	25	18.9	15.0
24	12.6	10.8	10.5	9.6	65	35	35	45	37	25	19.1	15.3
25	12.6	10.8	10.5	9.8	65	35	35	45	37	24	18.6	16.0
26	12.4	10.8	10.5	9.8	65	35	35	45	37	24	18.0	15.2
27	12.4	10.5	10.9	9.8	59	35	35	45	35	24	21	14.7
28	12.6	10.8	10.9	9.8	59	35	35	45	35	23	19.6	14.1
29	12.4	10.8	10.9	42	....	36	35	45	33	23	19.1	14.3
30	12.6	10.8	10.9	39	....	36	43	45	33	23	19.1	14.1
31	12.6	....	10.9	16	....	35	....	43	....	23	19.1	....

NOTE.—No record Nov. 20, 21, 28, 29, Dec. 1, 1912, and May 13, 1913; discharge interpolated by U. S. Geol. Survey.

Monthly discharge of San Antonio Creek near Upland, Cal., for the years ending Sept. 30, 1913 and 1915.

Month.	Discharge in second-feet.			Run-off (total in acre-feet).
	Maximum.	Minimum.	Mean.	
1912-13.				
October	11.0	9.0	9.36	576
November	9.0	8.6	8.65	515
December	8.7	8.7	8.70	535
January	8.7	6.5	7.24	445
February	12.5	7.1	8.45	469
March	10.0	9.0	9.56	588
April	17.4	10.0	14.7	875
May	16.4	13.0	15.1	928
June	15.1	11.1	12.8	762
July	10.6	8.1	9.33	574
August	8.7	7.1	7.76	477
September	7.1	6.5	6.87	409
The year	17.4	6.5	9.88	7,150
1914-15.				
October	15.3	12.1	13.2	812
November	12.4	10.5	11.5	684
December	13.6	10.3	10.9	670
January	42	9.6	12.5	769
February	118	18.0	60.6	3,370
March	59	35	45.0	2,770
April	43	31	35.1	2,090
May	47	43	44.6	2,740
June	45	33	39.3	2,340
July	33	23	27.5	1,690
August	23	18.0	20.2	1,240
September	19.1	14.1	16.6	988
The year	118	9.6	27.8	20,200

NOTE.—Monthly and yearly discharge computed by engineers of the U. S. Geological Survey.

SAN GABRIEL RIVER BASIN.

SAN GABRIEL RIVER NEAR AZUSA, CAL.

LOCATION.—In the NW. ¼ sec. 23, T. 1 N., R. 10 W., Los Angeles County, near road crossing at mouth of canyon, about one-half mile above Pacific Light & Power Corporation's power house and 2 miles north of Azusa.

DRAINAGE AREA.—222 square miles.

RECORDS AVAILABLE.—1894 to September 30, 1915.

GAGE.—Staff; read daily by J. G. Woodward. Original gage was just above ford at mouth of canyon, but many changes in gage and location have been necessitated by the frequent changes in channel. The position of the station has varied from 1,000 feet above ford to 600 feet below, and most of the gages have been installed at independent datums. Gage used January 29 to March 12, 1915, was installed in 1911 on left bank just above ford; a new gage on left bank 100 feet downstream was read March 13 to June 15 and a new gage on left bank 600 feet below ford was read from June 16 to July 26.

DISCHARGE MEASUREMENTS.—Made from cable 1,000 feet above ford or by wading near gage.

CHANNEL AND CONTROL.—Composed of gravel and bowlders; shifting during high water.

EXTREMES OF DISCHARGE.—Maximum stage during year from high-water mark, 7.8 feet January 29 (discharge, computed from extension of rating curve, about 2,770 second-feet). No flow for several months during the year.

1894-1915: Maximum stage recorded, 11.7 feet February 20, 1914 (discharge, 18,100 second-feet). No flow for several months every year.

DIVERSIONS.—The power canal of the Pacific Light & Power Corporation heads about 5 miles above the station. From June 2 to July 26 water was diverted through the tunnel about 500 feet above ford.

Regulation.—None.

Accuracy.—Results only fair from December to March as rating curve is not well defined; good for remainder of year. The diversion through tunnel above gage was estimated by observer and is included in the table of combined discharge of river and canals.

Discharge measurements of San Gabriel River near Azusa, Cal., during the year ending Sept. 30, 1915.

[Made by F. C. Ebert.]

Date.	Gage height.[a]			Discharge.	Date.	Gage height.[a]			Discharge.
	1	2	3			1	2	3	
	Feet.	*Feet.*	*Feet.*	*Sec.-ft.*		*Feet.*	*Feet.*	*Feet.*	*Sec.-ft.*
Dec. 23	0.94	......	......	23	Mar. 24	......	4.73	......	262
28	(b)	......	......	2.1	Apr. 9	......	4.67	......	220
Feb. 18	5.95	......	......	420	25	......	4.52	......	166
22	5.80	......	......	351	May 13	......	4.84	......	286
25	5.85	......	......	404	June 15	......	4.13	1.86	69
Mar. 13	5.56	4.79	......	256	28	......	......	1.48	23
17	5.62	4.85	......	274	July 5	......	......	1.48	27
22	5.54	4.72	......	262	17	......	......	1.16	3.5

[a] 1, Old gage installed in 1911 on left bank just above ford; 2, new gage on left bank 100 feet downstream from old; 3, new gage on left bank 600 feet below ford.

[b] Stream flowing down wagon road by-passing the gage.

Daily discharge, in second-feet, of San Gabriel River near Azusa, Cal., for the year ending Sept. 30, 1915.

Day.	Dec.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.
1	....	....	65	400	230	270	178	18
2	....	....	1,000	355	230	270	162	54
3	....	....	510	315	250	270	147	32
4	....	....	275	275	250	270	132	27
5	....	....	150	275	250	270	119	27
6	....	....	120	275	230	270	106	22
7	....	....	90	258	230	270	106	18
8	....	....	65	240	212	270	106	14
9	....	....	1,000	240	212	270	94	11
10	....	....	1,110	240	212	270	94	8
11	....	....	1,000	225	194	270	82	5
12	....	....	900	210	194	270	82	5
13	....	....	730	256	212	270	72	5
14	....	....	580	256	212	270	72	5
15	....	....	510	256	194	250	72	5
16	....	....	450	256	178	250	54	3
17	50	....	450	274	178	270	48	3
18	25	....	425	274	178	250	48	3
19	20	....	378	256	178	230	48	3
20	15	....	450	256	178	230	48	3
21	25	....	378	259	194	230	48	3
22	15	....	335	262	178	212	48	3
23	23	....	295	262	178	212	42	3
24	15	....	400	262	178	212	40	3
25	15	....	378	262	162	212	37	1.5
26	10	....	355	262	162	212	37	1.5
27	4	....	315	262	162	212	32	....
28	2	....	275	290	194	194	22	....
29	....	1,350	....	270	230	194	18	....
30	....	240	....	250	230	194	18	....
31	....	120	....	250	....	178	....	....

Note.—Discharge determined from rating curves as follows: Jan. 29 to Mar. 12, fairly well defined above 200 second-feet; Mar. 28 to June 15, well defined; and June 16 to July 26, well defined. Discharge Dec. 17-28, estimated from current meter measurements and observer's notes; Mar. 13-27, estimated from measurements. No flow Oct. 1 to Dec. 16, Dec. 29 to Jan. 28, and July 27 to Sept. 30.

Monthly discharge of San Gabriel River near Azusa, Cal., for the year ending Sept. 30, 1915.

Month.	Discharge in second-feet.			Run-off (total in acre-feet).	Accuracy.
	Maximum.	Minimum.	Mean.		
October	0	0	0	0	
November	0	0	0	0	
December	50	0	7.1	437	D.
January	1,350	0	55.2	3,390	D.
February	1,110	65	464	25,800	C.
March	400	210	267	16,400	C.
April	250	162	202	12,000	B.
May	270	178	243	14,900	B.
June	178	18	73.7	4,390	C.
July	54	0	9.23	568	C.
August	0	0	0	0	
September	0	0	0	0	
The year	1,350	0	108	77,900	

Combined daily discharge, in second-feet, of San Gabriel River and canals near Azusa, Cal., for the year ending Sept. 30, 1915.

Day.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.
1	43	46	56	66	145	480	320	360	268	138	90	61
2	44	46	58	66	1,080	435	320	360	272	164	90	58
3	50	43	51	66	590	395	340	360	267	126	90	60
4	51	41	50	70	355	355	340	360	252	137	84	58
5	50	41	51	70	230	355	340	360	239	137	76	56
6	49	40	55	68	200	355	320	360	226	132	76	55
7	50	40	52	65	170	338	320	360	226	128	69	57
8	49	40	51	64	145	320	302	360	226	124	68	58
9	49	41	49	65	1,080	320	302	360	214	121	68	56
10	47	44	54	64	1,190	320	302	360	214	118	66	56
11	45	45	67	63	1,080	305	284	360	202	115	64	56
12	46	44	66	62	980	290	284	360	202	115	62	56
13	43	43	63	61	810	336	302	360	192	115	64	58
14	43	42	58	60	660	336	302	360	192	115	63	60
15	41	42	56	61	590	336	284	340	192	115	62	59
16	40	42	55	60	530	336	268	340	174	113	62	56
17	42	41	125	59	530	354	268	360	168	113	60	55
18	42	39	95	59	505	354	268	340	168	113	58	52
19	43	38	90	59	458	336	268	320	168	113	56	50
20	43	38	83	59	530	336	268	320	168	113	56	51
21	47	38	95	57	458	339	284	320	168	113	55	50
22	48	39	85	59	415	342	268	302	168	109	53	48
23	47	39	93	59	375	342	268	302	162	109	53	48
24	44	39	85	58	480	352	268	302	160	103	53	49
25	43	39	85	70	458	352	252	302	157	98	52	55
26	42	39	80	70	435	352	252	302	157	98	52	57
27	41	39	74	67	395	352	252	283	152	90	55	56
28	40	39	72	70	355	380	264	284	142	90	66	54
29	42	41	70	1,430	....	360	300	284	138	90	64	51
30	44	42	70	320	....	340	300	284	138	90	62	50
31	46	....	68	200	....	340	....	268	....	90	60	....

NOTE.—See page 106 for table of daily discharge of Pacific Light & Power Corporation's canal near Azusa. There is no separate table for the other diversion.

Combined monthly discharge of San Gabriel River and canals near Azusa, Cal., for the year ending Sept. 30, 1915.

Month.	Discharge in second-feet.			Run-off (total in acre-feet).
	Maximum.	Minimum.	Mean.	
October	51	40	45.0	2,770
November	46	38	41.0	2,440
December	125	49	69.7	4,290
January	1,430	57	120	7,380
February	1,190	145	544	30,200
March	480	290	350	21,500
April	340	252	290	17,300
May	360	268	332	20,400
June	272	138	192	11,400
July	164	90	114	7,010
August	90	52	64.8	3,980
September	61	48	54.9	3,270
The year	1,430	38	182	132,000

NOTE.—Monthly and yearly discharge computed by engineers of the U. S. Geological Survey. See p. 106 for monthly and yearly discharge of Pacific Light & Power Corporation's canal near Azusa. There is no separate table for the other diversion.

PACIFIC LIGHT & POWER CORPORATION'S CANAL NEAR AZUSA, CAL.

LOCATION.—At Pacific Light & Power Corporation's power house, 1½ miles north of Azusa, Los Angeles County, and about 9 miles below intake on San Gabriel River.

RECORDS AVAILABLE.—1896 to September 30, 1915.

DISCHARGE.—Computed from records showing kilowatt output of plant, except at low water, when record at power plant is not reliable. Low-water discharge computed from weir records obtained at sand box about one-fourth mile below intake.

EXTREMES OF DISCHARGE.—1896–1915: Maximum mean daily discharge recorded, 90 second-feet during most of the period March 24 to August 3, 1915; no flow during periods in 1901 and 1912.

ACCURACY.—Results good.

The diversion dam for this canal is on San Gabriel River in the SE. ¼ SE. ¼ sec. 31, T. 2 N., R. 9 W., about 5 miles above gaging station on San Gabriel River near Azusa, at the mouth of the canyon. The water is used for power development at a point about 1½ miles north of Azusa and after leaving the power plant is divided for irrigation, a part being discharged into Azusa-Covina canal and the remainder into Duarte canal. During the rainy season part of the water from the power plant is wasted into San Gabriel River below the gaging station.

Daily discharge, in second-feet, of Pacific Light & Power Corporation's canal near Azusa, Cal., for the year ending Sept. 30, 1915.

Day.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.
1	43	46	56	66	80	80	90	90	90	90	90	61
2	44	46	58	66	80	80	90	90	90	90	90	58
3	50	43	51	66	80	80	90	90	90	90	90	60
4	51	41	50	70	80	80	90	90	90	90	84	58
5	50	41	51	70	80	80	90	90	90	90	76	56
6	49	40	55	68	80	80	90	90	90	90	76	55
7	50	40	52	65	80	80	90	90	90	90	69	57
8	49	40	51	64	80	80	90	90	90	90	68	58
9	49	41	49	65	80	80	90	90	90	90	68	56
10	47	44	54	64	80	80	90	90	90	90	66	56
11	45	45	67	63	80	80	90	90	90	90	64	56
12	46	44	66	62	80	80	90	90	90	90	62	56
13	43	43	63	61	80	80	90	90	90	90	64	58
14	43	42	58	60	80	80	90	90	90	90	63	60
15	41	42	56	61	80	80	90	90	90	90	62	59
16	40	42	55	60	80	80	90	90	90	90	62	56
17	42	41	75	59	80	80	90	90	90	90	60	55
18	42	39	70	59	80	80	90	90	90	90	58	52
19	43	38	70	59	80	80	90	90	90	90	56	50
20	43	38	68	59	80	80	90	90	90	90	56	51
21	47	38	70	57	80	80	90	90	90	90	55	50
22	48	39	70	59	80	80	90	90	90	90	53	48
23	47	39	70	59	80	80	90	90	90	90	53	48
24	44	39	70	58	80	90	90	90	90	90	53	49
25	43	39	70	70	80	90	90	90	90	90	52	55
26	42	39	70	70	80	90	90	90	90	90	52	57
27	41	39	70	67	80	90	90	71	90	90	55	56
28	40	39	70	70	80	90	70	90	90	90	66	54
29	42	41	70	80	....	90	70	90	90	90	64	51
30	44	42	70	80	....	90	70	90	90	90	62	50
31	46	....	68	80	....	90	....	90	....	90	60	....

Monthly discharge of Pacific Light & Power Corporation's canal near Azusa, Cal., for the year ending Sept. 30, 1915.

Month.	Discharge in second-feet.			Run-off (total in acre-feet).
	Maximum.	Minimum.	Mean.	
October	51	40	45.0	2,770
November	46	38	41.0	2,440
December	75	49	62.7	3,860
January	80	57	65.1	4,000
February	80	80	80.0	4,440
March	90	80	82.6	5,080
April	90	70	88.0	5,240
May	90	71	89.4	5,500
June	90	90	90.0	5,360
July	90	90	90.0	5,530
August	90	52	64.8	3,980
September	61	48	54.9	3,270
The year	90	38	71.1	51,500

LOS ANGELES RIVER BASIN.

ARROYO SECO NEAR PASADENA, CAL.

Location.—Near south line of sec. 30, T. 2 N., R. 12 W. (unsurveyed), just below trail crossing at forest ranger's station in Angeles National Forest, Los Angeles County, about 3 miles above Devils Gate and 5½ miles northwest of Pasadena.

Drainage area.—16.4 square miles.

Records available.—December 1, 1910, to September 30, 1915.

Gage.—Staff in two sections fastened to an alder tree on right bank 300 feet southeast of ranger station; read twice daily by R. C. Doughty, forest ranger.

Discharge measurements.—Made by wading below gage.

Channel and control.—Composed of solid rock, gravel, and boulders; shifts slightly during high water.

Extremes of discharge.—Maximum stage recorded during year, 5.6 feet at 7 a. m. February 3 (discharge, computed from extension of rating curve, 634 second-feet); minimum stage recorded, 2.94 feet October 19 to 22 at 5.30 p. m. (discharge, 0.5 second-foot).

1910–1915: Maximum stage recorded, 12.5 feet February 20, 1914 (discharge, 5,630 second-feet); minimum stage recorded, somewhat below 2.98 feet, the lower limit of gage, September 12 to 23, 1913 (estimated discharge, 0.1 second-foot).

Diversions.—None.

Regulation.—None.

Accuracy.—Results for low and medium stages good. High-water extension of rating curve based on cross section of channel and on slope data obtained after the flood of February, 1914. Results for high stages, fair.

Discharge measurements of Arroyo Seco near Pasadena, Cal., during the year ending Sept. 30, 1915.

[Made by F. C. Ebert.]

Date.	Gage height.	Discharge.	Date.	Gage height.	Discharge.	Date.	Gage height.	Discharge.
	Feet.	*Sec.-ft.*		*Feet.*	*Sec.-ft.*		*Feet.*	*Sec.-ft.*
Nov. 7	3.25	2.0	Mar. 15	3.56	15	June 15	3.22	4.0
Feb. 18	3.72	22	22	3.46	11	July 3	3.12	2.6
25	3.84	30	Apr. 26	3.34	7.1			

Daily discharge, in second-feet, of Arroyo Seco near Pasadena, Cal., for the year ending Sept. 30, 1915.

Day.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.
1	1	2.5	1	1	22	30	10	17	7	2	1	0.8
2	1	2	2	1	117	29	10	16	7	2	.9	.8
3	1.5	1.5	1.5	1	435	26	10	17	6.5	2	.9	.8
4	1.5	1	1	1	72	25	11	21	6.5	2	.8	.8
5	1.5	1	1	1	26	23	12	22	6	2	.8	.8
6	1.5	1	1	1	21	23	10	18	6	2	.8	.8
7	1	.8	1	1	18	22	9	16	6	1.5	.8	.8
8	1.5	.8	1	1	16	21	9	15	6	1.5	.8	.8
9	1.5	.9	1.5	1	200	19	9	14	6	1.5	.8	.8
10	1.5	.8	3.5	1	238	18	9	13	6	1.5	.8	.8
11	1.5	.8	3.5	1	130	17	9	12	6	1.5	.8	.8
12	1.5	.7	3	1	62	16	8.5	12	6	1.5	.8	.8
13	1.5	.5	2.5	1	50	16	9	12	5.5	1.5	.8	.8
14	1.5	.8	2.5	1	41	16	10	11	5.5	1.5	.7	.8
15	1.5	.3	2.5	1	26	15	9	11	5.5	1.5	.7	.8
16	1.5	.3	4	1.5	24	15	8	11	5	1.5	.7	.8
17	1.5	.2	28	1.5	23	14	8	11	5	1.5	.6	.8
18	1.5	.2	30	1	22	14	7.5	10	4.5	1	.7	.8
19	1.5	.3	32	1	21	14	7	10	4	1	.6	.8
20	1.5	.3	31	1	26	13	6.5	9.5	3.5	1	.6	.8
21	2	.3	33	1	23	13	7.5	9	3.5	1	.5	.8
22	2	.3	41	1	23	12	8	9	3.5	1	.5	.8
23	1.5	.3	42	1	22	12	8	9	3.5	1	.8	.8
24	1.5	.3	36	1	32	11	7.5	9	3	1	.9	.9
25	1.5	.3	30	4	37	11	7.5	8.5	3	1	.8	.9
26	1.5	.3	25	3	26	11	7.5	8	3	1	.8	.9
27	1.5	.3	17	3.5	20	11	7.5	8	2.5	1	.8	.9
28	1.5	.3	11	12	22	16	10	8	2.5	1	.8	.9
29	2.5	.4	6.5	349	......	12	17	7.5	2.5	1	.7	.9
30	2.5	.5	3.5	223	......	11	17	7.5	2	1	.7	.8
31	2.5	......	2.5	77	......	10	......	7.5	......	1	.7	......

NOTE.—Discharge determined from two rating curves as follows: Oct. 1 to Feb. 3, poorly defined; Feb. 4 to Sept. 30, well defined between 1 and 200 second-feet.

Monthly discharge of Arroyo Seco River near Pasadena, Cal., for the year ending Sept. 30, 1915.

Month.	Discharge in second-feet.			Run-off (total in acre-feet).	Accuracy.
	Maximum.	Minimum.	Mean.		
October	2.5	1.0	1.58	97	D.
November	2.5	.2	.67	40	D.
December	42	1.0	12.9	793	C.
January	349	1.0	22.5	1,380	C.
February	435	16	64.1	3,560	B.
March	30	10	16.6	1,020	B.
April	17	6.5	9.30	553	B.
May	22	7.5	11.9	732	B.
June	7.0	2.0	4.75	283	C.
July	2.0	1.0	1.37	84	D.
August	1.0	.5	.75	46	D.
September	.9	.8	.82	49	D.
The year	435	.2	11.9	8,640	

SANTA YNEZ RIVER BASIN.

SANTA YNEZ RIVER NEAR SANTA BARBARA, CAL.

LOCATION.—In the SE. ¼ SE. ¼ sec. 10, T. 5 N., R. 27 W., one-fourth mile below Gibraltar dam site, about 7 miles north of Santa Barbara, Santa Barbara County. Mono Creek enters 3½ miles above the station.

DRAINAGE AREA.—218 square miles (measured on topographic map).

RECORDS AVAILABLE.—November 1, 1903, to April 30, 1907; October 1, 1907, to January 31, 1908; February 6, 1910, to March 31, 1915. For station about 5 miles above present site, November 21, 1902, to June 20, 1903.

Gage.—Staff in three sections about 900 feet below north portal of the Santa Barbara water-supply tunnel. On April 13, 1911, gage datum was lowered 5.00 feet.

Discharge measurements.—Made by wading at various sections from 1 mile above gage to 400 feet below gage.

Channel and control.—Sand and gravel; shifts greatly during extremely high water; relatively permanent at low water.

Extremes of discharge.—Maximum stage recorded during year, 11.40 feet at 7 a. m., February 9 (discharge, computed from extension of rating curve, about 3,340 second-feet); minimum stage, not known; no gage-height record August 16 to September 30.

1904–1915: Maximum stage recorded, 23.0 feet at 8 p. m., January 25, 1914 (discharge, 13,100 second-feet); no flow during most of July to September, 1904.

Diversions.—None.

Regulations.—None.

Accuracy.—Results good except for high stages when no current-meter measurements were made. Discharge interpolated between measurements when change in stage was very gradual; for other periods, estimated from current-meter measurements or computed by indirect method for shifting control. Only one measurement was made after March 31; discharge April 1 to September 30 not determined. Gage not read August 16 to September 30.

Discharge measurements of Santa Ynez River near Santa Barbara, Cal., during the year ending Sept. 30, 1915.

Date.	Made by—	Gage height.	Discharge.	Date.	Made by—	Gage height.	Discharge.
		Feet.	*Sec.-ft.*			*Feet.*	*Sec.-ft.*
Oct. 6	W. M. Coffey	4.10	1.8	Feb. 1	F. E. Thompson	5.50	190
6	.....do	4.10	2.2	5	.....do	5.40	171
6	.....do	4.10	2.0	6	.....do	5.34	129
7	.....do	4.10	1.9	7	.....do	5.18	120
Nov. 7	.....do	4.14	2.9	8	.....do	4.96	99
8	.....do	4.14	2.7	16	.....do	5.66	334
13	.....do	4.15	2.7	17	.....do	6.05	503
Dec. 21	F. E. Thompson	4.46	24	18	.....do	5.88	428
22	.....do	4.44	19	19	.....do	5.64	356
23	.....do	4.41	18	20	.....do	5.64	341
24	.....do	4.40	16	21	.....do	5.64	350
25	.....do	4.38	16	22	.....do	5.56	294
26	.....do	4.37	16	23	.....do	5.42	276
27	.....do	4.37	15	24	.....do	5.64	350
28	.....do	4.35	14	25	.....do	5.70	373
29	.....do	4.35	14	26	.....do	5.58	325
30	.....do	4.33	13	27	.....do	5.49	309
31	.....do	4.33	13	28	.....do	5.42	288
Jan. 1	.....do	4.32	13	Mar. 1	.....do	5.50	309
2	.....do	4.32	13	2	R. B. Whitman	5.45	282
3	.....do	4.32	13	3	.....do	5.39	283
4	.....do	4.32	13	4	.....do	5.32	262
5	.....do	4.32	13	5	.....do	5.30	237
6	.....do	4.32	12	6	.....do	5.28	229
7	.....do	4.32	12	7	.....do	5.24	210
8	.....do	4.32	12	8	.....do	5.21	218
9	.....do	4.38	16	9	.....do	5.19	203
10	.....do	4.35	14	10	.....do	5.15	185
11	.....do	4.33	14	11	.....do	5.10	183
12	.....do	4.33	13	12	.....do	5.10	178
13	.....do	4.32	13	13	.....do	5.08	164
14	.....do	4.32	12	14	.....do	5.05	159
15	.....do	4.32	12	15	.....do	5.03	152
16	.....do	4.32	12	16	.....do	5.01	145
17	.....do	4.32	12	17	.....do	5.00	130
18	.....do	4.31	12	18	.....do	4.99	123
19	F. C. Ebert	4.30	10	19	.....do	4.98	120
19	F. E. Thompson	4.30	10	20	.....do	4.97	117
20	.....do	4.30	11	21	.....do	4.95	111
21	.....do	4.30	10	22	.....do	4.94	112
22	.....do	4.30	11	23	.....do	4.93	106
23	.....do	4.30	10	27	.....do	4.89	97
24	.....do	4.30	10	28	.....do	5.22	170
25	.....do	4.35	12	29	.....do	5.17	187
26	.....do	4.35	13	30	.....do	5.00	133
27	.....do	4.36	13	31	.....do	4.98	117
28	.....do	4.50	24	Apr. 21	E. Pyzel	4.68	64
31	.....do	5.73	202				

Daily discharge, in second-feet, of Santa Ynez River near Santa Barbara, Cal., for the period Oct. 1, 1914, to Mar. 31, 1915.

Day.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Day.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.
1	2	3	15	13	190	309	16	2	2.5	12	12	320	145
2	2	3	9.5	13	1,560	282	17	2	2.5	46	12	570	130
3	2	3	7.5	13	520	283	18	2.5	2.5	28	12	428	123
4	2	3	9	13	325	262	19	2.5	2.5	28	10	356	120
5	2	3	9	13	171	237	20	2.5	2.5	26	11	341	117
6	2	3	9.5	12	129	229	21	2.5	2.5	24	10	350	117
7	2	3	9	12	114	210	22	2.5	2.5	19	11	294	112
8	2	2.5	8	12	113	218	23	2.5	2.5	18	10	276	106
9	2	2.5	8.5	16	2,360	203	24	2.5	2.5	16	10	360	104
10	2.5	2.5	14	14	1,130	185	25	2.5	2.5	16	12	373	102
11	2	2.5	28	14	900	183	26	2.5	2.5	16	13	325	100
12	2	2.5	35	13	710	178	27	2.5	2.5	15	13	309	97
13	2	2.5	31	13	570	164	28	2.5	4	14	36	305	190
14	2	2.5	16	12	455	159	29	2.5	3	14	1,020	......	187
15	2	2.5	14	12	370	152	30	3	2.5	13	395	......	133
							31	3	......	13	207	......	117

Monthly discharge of Santa Ynez River near Santa Barbara, Cal., for the period Oct. 1, 1914, to Mar. 31, 1915.

[Drainage area, 218 square miles.]

Month.	Discharge in second-feet.			Run-off (total in acre-feet).	Accuracy.
	Maximum.	Minimum.	Mean.		
October	3	2	2.27	140	D.
November	4	2.5	2.68	159	D.
December	46	7.5	17.5	1,080	C.
January	1,020	10	64.2	3,950	C.
February	2,360	113	508	28,200	C.
March	309	97	169	10,400	B.

SANTA YNEZ RIVER NEAR LOMPOC, CAL.

Location.—At highway bridge near east boundary of La Misión Vieja de la Purísima grant, Santa Barbara County, about 1½ miles east of Lompoc.

Drainage area.—725 square miles.

Records available.—November 10, 1906, to January 9, 1907, and September 25, 1907, to September 30, 1915.

Gage.—Vertical staff fastened to pier of bridge, lower section at right end of center span and upper section at left end; read once a day by Donald McDonald. During high water additional readings are taken.

Discharge measurements.—Made from bridge at gage or by wading.

Channel and control.—Composed of sand, which scours out during high water and fills in again as the flow decreases.

Extremes of discharge.—Maximum stage recorded during year, 5.5 feet at 6.30 a. m. February 9 (discharge, about 41,500 second-feet, computed from extension of rating curve); minimum stage recorded, −0.25 foot October 12 and 13 (discharge, 24 second-feet).

1906–1915: Maximum stage recorded, 13.0 feet January 25, 1914 (discharge 41,800 second-feet); minimum discharge, 5 second-feet October 13 to 21, 1913.

Diversions..—Water is not diverted above the station, but there is some pumping from wells along the banks of the river for irrigation purposes.

Regulation.—None.

Accuracy.—Results fair. Frequent discharge measurements were made and extra gage-height observations furnished during high-water period. Daily discharge interpolated between measurements during low water, when change in stage was very gradual. For remainder of year discharge computed by indirect method and from rating curves covering short periods.

Discharge measurements of Santa Ynez River near Lompoc, Cal., during the year ending Sept. 30, 1915.

Date.	Made by—	Gage height.	Discharge.	Date.	Made by—	Gage height.	Discharge.
		Feet.	*Sec.-ft.*			*Feet.*	*Sec.-ft.*
Oct. 5	Donald McDonald	−0.25	25	Mar. 29	Donald McDonald	1.10	522
10	do	− .25	26	Apr. 5	do	.85	310
12	do	− .25	24	12	do	.85	305
19	do	− .25	29	17	do	.86	267
26	do	− .28	27	19	do	.90	256
Nov. 7	do	− .25	31	26	do	.82	264
9	do	− .25	33	May 3	do	.95	367
16	do	− .22	32	6	do	1.30	860
23	do	− .22	30	11	do	1.10	433
30	do	− .22	28	18	do	1.00	304
Dec. 7	do	− .10	49	24	do	.90	245
12	do	.00	83	June 3	do	.80	144
14	do	.00	83	3	Ewald Pyzel	.80	156
21	do	.05	111	7	Donald McDonald	.78	164
28	do	− .10	85	12	do	.78	143
Jan. 4	do	− .05	75	14	do	.75	126
11	do	− .10	73	21	do	.70	129
16	do	− .10	71	29	do	.72	85
18	do	− .10	77	July 5	do	.70	96
20	do	− .12	64	10	do	.70	77
20	F. C. Ebert	− .12	70	12	do	.68	85
25	Donald McDonald	− .10	76	Aug. 2	do	.62	57
Feb. 1	do	.75	828	7	do	.60	44
6	do	.70	837	9	do	.60	46
9	do	4.85	37,900	16	do	.60	46
15	do	1.05	1,590	23	do	.60	47
22	do	.85	1,280	Sept. 6	do	.60	31
Mar. 6	do	1.10	845	11	do	.60	38
8	do	1.10	850	13	do	.60	37
15	do	1.10	510				

Daily discharge, in second-feet, of Santa Ynez River near Lompoc, Cal., for the year ending Sept. 30, 1915.

Day.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.
1	29	29	85	80	1,080	1,550	365	325	165	88	59	37
2	28	29	70	78	6,100	1,650	365	400	155	90	57	36
3	27	29	50	77	4,880	1,350	335	367	150	92	55	35
4	26	30	50	75	2,170	1,050	355	460	153	94	52	34
5	25	30	70	75	1,080	950	310	1,720	157	96	49	33
6	25	30	50	75	837	845	310	860	160	92	46	31
7	25	31	49	74	837	848	310	830	164	88	44	32
8	26	32	55	74	2,950	850	335	620	160	84	45	34
9	26	33	62	73	32,500	800	305	530	156	80	46	35
10	26	33	69	73	20,200	1,050	305	510	152	77	46	37
11	25	33	76	73	15,500	850	305	433	148	81	46	38
12	24	33	83	73	9,200	800	305	425	143	85	46	38
13	24	32	83	72	5,700	600	298	415	135	84	46	37
14	25	32	83	72	3,100	550	290	365	126	83	46	37
15	26	32	85	71	1,590	510	282	325	126	81	46	37
16	27	32	85	71	1,500	510	274	315	127	80	46	37
17	28	32	270	74	2,100	510	267	310	127	79	46	37
18	29	32	110	77	2,350	460	262	304	128	77	46	36
19	29	31	165	72	2,000	460	256	295	128	76	46	36
20	29	31	135	67	2,250	460	260	285	129	75	47	36
21	29	30	111	68	1,900	460	265	275	129	73	47	36
22	28	30	90	70	1,280	460	250	265	124	72	47	36
23	28	30	80	72	1,500	410	260	255	118	71	47	36
24	27	30	85	74	3,450	410	290	245	113	69	45	36
25	27	30	70	76	2,200	410	275	235	107	68	44	35
26	27	29	55	76	1,700	410	264	225	102	67	43	35
27	27	29	80	76	1,600	410	265	215	96	65	42	35
28	27	28	85	160	1,300	410	265	205	91	64	41	35
29	28	28	84	1,760		522	265	195	85	63	40	35
30	28	28	82	5,300		460	320	185	86	61	39	35
31	28		81	1,480		365		175		60	38	

Monthly discharge of Santa Ynez River near Lompoc, Cal., for the year ending Sept. 30, 1915.

[Drainage area, 725 square miles.]

Month.	Discharge in second-feet.				Run-off.		Accuracy.
	Maximum.	Minimum.	Mean.	Per square mile.	Depth in inches on drainage area.	Total in acre-feet.	
October	29	24	26.9	0.037	0.04	1,650	C.
November	33	28	30.6	.042	.05	1,820	C.
December	270	49	86.7	.120	.14	5,330	C.
January	5,300	67	345	.476	.55	21,200	C.
February	32,500	837	4,740	6.54	6.81	263,000	D.
March	1,650	365	690	.952	1.10	42,400	C.
April	365	250	293	.404	.45	17,400	C.
May	1,720	175	405	.559	.64	24,900	C.
June	165	85	131	.181	.20	7,800	C.
July	96	60	77.9	.107	.12	4,790	C.
August	59	38	46.2	.064	.07	2,840	C.
September	38	31	35.6	.049	.05	2,120	C.
The year	32,500	24	547	.754	10.22	395,000	

SALINAS RIVER BASIN.

ARROYO SECO NEAR SOLEDAD, CAL.

Location.—In sec. 21, T. 19 S., R. 6 E., at Pettitt's ranch, about 15 miles south of Soledad, Monterey County.

Drainage area.—215 square miles.

Records available.—January 1, 1901, to September 30, 1915.

Gage.—Staff in two sections on right bank; lower section fastened to an alder 400 feet above cable, upper section fastened to sycamore about 100 feet downstream. The lower section was washed out February 9. It was replaced in two sections at same location and datum as previous section. Gage read daily by Mrs. Charles Pettitt; more frequent readings during floods.

Discharge measurements.—Made from cable 400 feet below gage or by wading.

Channel and control.—Composed of gravel; fairly permanent except during high water.

Extremes of discharge.—Maximum stage during year was not recorded as section of gage was washed out February 9. A reading of 12.2 feet was secured in afternoon of that day (discharge, about 7,200 second-feet); minimum stage recorded, 1.95 feet August 31 and September 1 and 7 (discharge, 14 second-feet).

1901–1915: Maximum stage recorded, 20.5 feet January 25, 1914 (discharge, 17,500 second-feet). No flow during periods in 1902 to 1904, 1906, 1908, 1913, and 1914.

Diversions.—None.

Regulation.—None.

Accuracy.—Results only fair on account of changes in channel. Discharge February 9 to 24 estimated from observer's notes, rainfall records, and discharge measurement.

Discharge measurements of Arroyo Seco near Soledad, Cal., during the year ending Sept. 30, 1915.

Date.	Made by—	Gage height.	Discharge.	Date.	Made by—	Gage height.	Discharge.
		Feet.	*Sec.-ft.*			*Feet.*	*Sec.-ft.*
Jan. 30	Charles Pettitt	7.60	2,030	Apr. 8	Charles Pettitt	3.90	337
Feb. 24	Leidl and Pettitt	5.85	1,400	19	.....do	3.45	283
25	Charles Leidl	5.60	1,180	June 6	.....do	3.05	160
25	.....do	5.57	1,080	July 8	.....do	2.60	65
Mar. 26	Charles Pettitt	3.52	221	Aug. 15	.....do	2.16	26
29	.....do	5.15	932				

Daily discharge, in second-feet, of Arroyo Seco near Soledad, Cal., for the year ending Sept. 30, 1915.

Day.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.
1	9.5	15	21	162	1,440	895	535	250	180	74	32	14
2	10	16	22	148	4,180	840	535	238	170	74	32	16
3	10	15	25	141	1,800	785	512	238	170	74	32	16
4	10	15	46	222	1,510	730	432	950	170	67	28	16
5	10	15	76	180	960	630	414	730	150	67	28	16
6	10	14	60	222	760	630	380	490	140	67	28	16
7	10	14	50	204	648	580	380	432	131	67	28	14
8	10	13	37	302	4,380	535	364	397	122	67	28	16
9	10	13	28	356	5,500	490	364	380	122	67	24	16
10	10	13	54	273	2,500	490	348	364	113	67	24	16
11	10	13	108	227	1,500	490	333	348	113	61	24	16
12	10	13	122	340	800	470	304	333	113	61	24	16
13	11	13	96	324	600	470	276	318	113	61	24	18
14	11	13	60	324	550	470	263	290	113	55	24	21
15	11	13	48	304	500	450	263	276	104	55	24	21
16	10	13	28	296	500	450	250	263	104	55	24	18
17	11	13	379	234	4,000	432	238	263	104	50	21	18
18	15	13	760	229	2,500	414	238	263	96	50	21	18
19	15	13	388	200	1,000	380	226	263	96	50	21	21
20	15	13	340	182	1,500	364	214	250	96	45	21	21
21	15	13	283	190	1,000	348	263	250	88	45	21	21
22	15	13	200	186	800	333	226	238	88	45	21	21
23	14	13	190	178	700	333	214	238	88	40	18	21
24	14	13	180	171	1,400	290	214	226	81	40	18	21
25	14	13	180	296	1,180	263	202	226	81	36	16	24
26	13	13	162	68	1,060	238	238	214	81	36	16	24
27	13	13	162	58	950	238	238	214	81	36	16	24
28	13	13	162	670	895	2,110	276	202	81	36	16	24
29	12	13	162	1,580	....	950	250	191	74	36	16	28
30	12	13	158	2,770	....	680	238	191	74	36	16	28
31	12	....	158	1,020	....	730	....	185	....	32	14	....

NOTE.—Discharge determined as follows: Oct. 1 to Dec. 17, from a well-defined rating curve, but its applicability to this period has not been established by measurements; Dec. 18 to Feb. 8, from a fairly reliable rating curve; Feb. 9–23, estimated from rainfall and observer's notes; Feb. 24, from discharge measurement; Feb. 25 to Sept. 30, from a rating curve fairly well defined between 15 and 2,000 second-feet

Monthly discharge of Arroyo Seco near Soledad, Cal., for the year ending Sept. 30, 1915.

[Drainage area, 215 square miles.]

Month.	Discharge in second-feet.				Run-off.		Accuracy.
	Maximum.	Minimum.	Mean.	Per square mile.	Depth in inches on drainage area.	Total in acre-feet.	
October	15	9.5	11.8	0.055	0.06	726	C.
November	16	13	13.4	.062	.07	797	C.
December	760	21	153	.712	.82	9,410	D.
January	2,770	58	389	1.81	2.09	23,900	D.
February	5,500	500	1,610	7.49	7.80	89,400	D.
March	2,110	238	565	2.63	3.03	34,700	C.
April	535	202	308	1.43	1.60	18,300	C.
May	950	185	313	1.46	1.68	19,200	C.
June	180	74	111	.516	.58	6.600	C.
July	74	32	53.3	.248	.29	3,280	C.
August	32	14	22.6	.105	.12	1,390	C.
September	28	14	19.3	.090	.10	1.150	C.
The year	5,500	9.5	289	1.34	18.24	209,000	

ALAMEDA CREEK BASIN.

ALAMEDA CREEK AT SUNOLGLEN, CAL.

LOCATION.—In the SE. ¼ sec. 7, T. 4 S., R. 1 E., at Sunol dam, about 1 mile below junction with Arroyo de la Laguna, and 1 mile west of Sunolglen, Alameda County.

DRAINAGE AREA.—620 square miles (measured by Spring Valley Water Co.).

RECORDS AVAILABLE.—October 4, 1900, to September 30, 1915.

GAGE.—Gurley electric water-stage recorder on upstream face of dam on left bank. Previous to 1914 a staff gage on upstream side of dam on right bank was used.

DISCHARGE MEASUREMENTS.—Made from suspension footbridge about 400 feet above dam. Heavy weights and stay line are used for high-water measurements to insure correct position of current meter.

CHANNEL AND CONTROL.—The concrete dam acts as a control for the station. Channel above and below dam is composed of gravel and boulders and shifts during high water.

EXTREMES OF DISCHARGE.—1901–1915: Maximum mean daily discharge, 14,700 second feet March 7, 1911; minimum, no flow for a part of nearly every year.

DIVERSIONS.—See Spring Valley aqueduct near Sunolglen.

REGULATION.—None.

ACCURACY.—The dam has been rated in accordance with the cooperative agreement between the Spring Valley Water Co. and the City of San Francisco. Current-meter measurements have been secured by both parties and a rating curve developed, which has been accepted by both.

COOPERATION.—Records showing million gallons per day were furnished by the Spring Valley Water Co. through F. C. Herrmann, chief engineer, and G. A. Elliott, engineer. Daily discharge converted into second-feet and monthly discharge computed by the United States Geological Survey.

Daily discharge, in second-feet, of Alameda Creek at Sunolglen, Cal., for the year ending Sept. 30, 1915.

Day.	Dec.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.
1	....	0.0	3,140	750	350	83	105	14	0.2
2	....	.0	6,680	608	282	83	95	14	.2
3	....	.0	5,150	518	246	87	82	7.0	.2
4	....	44.0	2,340	456	210	198	75	7.0	.2
5	....	63	1,340	390	187	846	62	7.0	.2
6	....	101	870	347	170	487	55	7.0	.2
7	....	159	724	317	165	336	48	7.0	.2
8	....	387	3,800	291	142	257	42	7.0	.2
9	....	427	5,580	265	165	227	27	7.0	.2
10	....	191	4,120	243	149	294	29	7.0	.2
11	....	149	2,340	231	134	644	29	7.0	.2
12	41	599	1,720	221	134	864	29	6.0	.2
13	16	330	1,190	214	129	594	27	5.0	.3
14	.0	681	708	193	119	459	23	4.0	.3
15	.0	420	565	171	100	344	18	2.9	.2
16	.0	267	515	158	95	289	17	2.5	.2
17	21	184	1,610	146	76	531	17	.6	....
18	152	112	1,250	134	58	939	17	.6	....
19	126	77	692	125	55	674	17	.6	....
20	77	58	1,310	123	55	459	14	.5	....
21	27	53	1,010	119	58	378	14	.5	....
22	7.0	41	1,430	108	72	320	14	.5	....
23	4.6	33	1,310	100	75	285	14	.3	....
24	2.6	33	1,440	100	78	257	14	.3	....
25	1.9	58	1,260	100	78	221	14	.3	....
26	1.9	71	904	100	78	182	13	.3	....
27	2.3	58	752	123	78	165	11	.2	....
28	2.6	147	1,190	256	78	139	11	.2	....
29	4.6	1,940	....	356	78	134	9.0	.2	....
30	2.6	2,830	....	235	78	124	9.0	.2	....
31	.0	3,010	....	374	....	110	....	.2	....

NOTE.—No flow Oct. 1 to Dec. 11 and Aug. 17 to Sept. 30.

Monthly discharge of Alameda Creek at Sunolglen, Cal., for the year ending Sept. 30, 1915.

Month.	Discharge in second-feet.			Run-off (total in acre-feet).
	Maximum.	Minimum.	Mean.	
October	0.0	0.0	0.0	0
November	.0	.0	.0	0
December	152	.0	15.8	972
January	3,010	.0	404	24,800
February	6,680	515	1,960	109,000
March	750	100	254	15,600
April	350	55	126	7,500
May	939	83	355	21,800
June	105	9.0	31.7	1,890
July	14	.2	3.77	232
August	.3	.0	.11	7
September	.0	.0	.0	0
The year	6,680	.0	251	182,000

NOTE.—Monthly and yearly discharge computed by engineers of the U. S. Geological Survey.

SPRING VALLEY WATER CO.'S AQUEDUCT NEAR SUNOLGLEN, CAL.

Location.—In sec. 12, T. 4 S., R. 1 W., at Brightside weir, about 2½ miles west of Sunolglen, Alameda County.

Records available.—April 6, 1903, to September 30, 1915.

Gage.—Spring Valley water-stage recorder in pool above the weirs.

Discharge.—Computed from gage-height record showing head over four rectangular weirs. The weirs are made of bronze and have a 30-inch crest.

Extremes of discharge.—1903–1915: Maximum mean daily discharge reported, 47 second-feet March 21, 1914; minimum discharge, 0.9 second-foot March 25 to 30, 1907.

Accuracy.—The weirs were very carefully installed and much care is exercised in their maintenance. There is no velocity of approach.

Cooperation.—Records showing million gallons per day were furnished by the Spring Valley Water Co. through F. C. Herrman, chief engineer, and G. A. Elliott, engineer. Daily discharge converted into second-feet and monthly discharge computed by the United States Geological Survey.

Daily discharge, in second-feet, of Spring Valley Water Co.'s aqueduct near Sunolglen Cal., for the year ending Sept. 30, 1915.

Day.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.
1	26	23	23	34	37	35	34	35	37	33	33	33
2	23	22	23	33	37	35	34	34	37	34	33	34
3	25	22	23	34	36	34	35	36	35	36	33	34
4	25	22	23	36	34	34	35	38	37	36	33	33
5	26	22	23	34	34	34	34	36	38	37	33	34
6	26	22	24	34	34	36	36	35	38	37	33	32
7	25	22	24	34	35	35	37	36	39	36	34	34
8	25	22	13.6	35	37	35	36	36	38	36	33	31
9	25	16.2	24	34	36	35	36	36	38	35	27	32
10	25	16.7	24	34	36	37	34	36	38	35	27	32
11	24	16.9	27	35	35	36	35	36	37	35	27	32
12	24	16.7	34	35	36	36	36	36	38	35	26	32
13	25	16.7	35	35	36	36	36	36	40	35	26	31
14	25	16.7	34	35	35	36	35	36	40	35	27	31
15	25	16.7	34	35	35	36	35	35	41	34	30	31
16	23	16.7	32	35	36	37	34	36	41	34	34	31
17	23	16.9	34	35	35	37	37	38	41	35	35	34
18	24	16.7	35	35	35	37	38	39	41	35	33	33
19	25	16.4	35	35	35	36	39	38	36	34	34	33
20	25	16.7	35	34	35	37	39	37	36	37	34	32
21	25	21	35	34	35	36	40	35	36	36	34	32
22	25	23	35	34	35	36	37	35	35	34	34	32
23	25	23	35	36	35	34	36	37	36	35	34	32
24	25	23	35	36	35	32	37	36	36	35	34	32
25	25	23	35	36	35	34	37	36	36	34	34	32
26	24	24	34	36	35	34	37	40	36	33	34	32
27	22	21	35	37	35	35	37	40	37	34	34	31
28	22	23	35	36	35	35	36	40	35	33	33	32
29	22	23	34	31	....	35	35	39	34	34	32	30
30	21	23	35	36	....	35	35	39	32	34	32	30
31	22	....	35	37	....	36	....	38	....	33	31	....

Monthly discharge of Spring Valley Water Co.'s aqueduct near Sunolglen, Cal., for the year ending Sept. 30, 1915.

Month.	Discharge in second-feet.			Run-off (total in acre-feet).
	Maximum.	Minimum.	Mean.	
October	26	21	24.3	1,490
November	24	16.2	20.1	1,200
December	35	13.6	30.4	1,870
January	37	31	34.8	2,140
February	37	34	35.3	1,960
March	37	32	35.4	2,180
April	40	34	36.1	2,150
May	40	34	36.8	2,260
June	41	32	37.3	2,220
July	37	33	34.8	2,140
August	35	26	32.0	1,970
September	34	30	32.1	1,910
The year	41	13.6	32.4	23,500

NOTE.—Monthly and yearly discharge computed by engineers of the U. S. Geological Survey.

KERN RIVER BASIN.

KERN RIVER NEAR KERNVILLE, CAL.

LOCATION.—In sec. 14, T. 23 S., R. 32 E., in Tulare County, at base of Fairview Mountain, in Kern National Forest, 3 miles above Salmon Creek, and about 15 miles north of Kernville, Kern County.

DRAINAGE AREA.—Not measured.

RECORDS AVAILABLE.—January 1, 1912, to September 30, 1915.

GAGE.—Friez water-stage recorder on left bank about 1 mile above mouth of Tobias Creek. Original gage was vertical staff in three sections fastened to overhanging willow tree on left bank about 160 feet upstream from recorder. From April 1 to September 14, 1913, readings were taken from a temporary staff gage in two sections located a quarter mile upstream. The readings were reduced to the original gage by a relation curve. The first gage was replaced March 17, 1914, by a vertical staff in two sections, 7 feet downstream from the original one, on the same bank and at the same datum. The recorder was installed September 15, 1913, in the same pool and at the same datum.

DISCHARGE MEASUREMENTS.—Made from car and cable about 90 feet below recorder or by wading.

CHANNEL AND CONTROL.—Coarse gravel and boulders; apparently permanent.

EXTREMES OF DISCHARGE.—Maximum stage during year from water-stage recorder, 4.94 feet at 7 a. m. June 9 (discharge, 4,090 second-feet); minimum stage from water-stage recorder, −0.43 foot from 2 to 4 p. m. February 3 (discharge, 194 second-feet).

1912–1915: Maximum stage recorded, 4.94 feet from water-stage recorder at 7 a. m. June 9, 1915 (discharge, 4,090 second-feet); minimum stage recorded, −0.75 foot January 6, 1913 (discharge, 142 second-feet).

DIVERSIONS.—No information.

REGULATION.—No information.

ACCURACY.—Results excellent.

Discharge measurements of Kern River near Kernville, Cal., during the year ending Sept. 30, 1915.

[Made by H. J. Tompkins.]

Date.	Gage height.	Discharge.	Date.	Gage height.	Discharge.
	Feet.	*Sec.-ft.*		*Feet.*	*Sec.-ft.*
Oct. 7	0.20	328	June 15	3.60	2,670
June 13	3.50	2,560			

Daily discharge, in second-feet, of Kern River near Kernville, Cal., for the year ending Sept. 30, 1915.

Day.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.
1	407	285	245	262	278	340	652	830	3,440	2,040	488	308
2	391	288	238	262	312	322	750	830	3,330	1,990	470	308
3	373	285	278	262	222	318	802	775	2,900	2,040	470	320
4	364	282	278	278	242	325	830	830	2,500	1,940	470	315
5	358	278	252	260	282	338	802	860	2,360	1,770	452	300
6	352	275	240	275	310	340	725	830	2,600	1,400	452	282
7	343	270	232	258	302	340	725	920	3,000	1,210	435	272
8	338	265	226	268	302	338	775	920	3,440	1,210	432	265
9	335	265	236	268	340	328	775	890	3,680	1,360	414	260
10	325	265	252	265	343	322	830	1,010	3,560	1,440	407	265
11	315	265	250	280	340	322	890	1,080	3,330	1,520	400	312
12	315	265	262	282	302	338	1,010	1,210	2,700	1,480	391	282
13	310	265	250	272	308	349	1,110	1,320	2,360	1,360	382	265
14	308	262	268	308	315	391	950	1,240	2,310	1,210	373	265
15	302	262	295	288	325	470	860	1,320	2,450	1,080	370	265
16	302	260	285	268	376	545	830	1,520	2,500	980	364	258
17	300	258	288	265	397	585	860	1,900	2,500	950	355	245
18	290	248	275	305	394	585	1,040	1,730	2,600	890	346	240
19	290	240	270	300	349	630	1,210	1,520	2,310	860	340	238
20	290	240	282	295	340	652	1,360	1,360	2,170	830	332	234
21	292	240	270	295	312	700	1,360	1,360	2,260	830	322	228
22	308	250	275	295	310	750	1,180	1,400	2,310	950	315	224
23	305	252	288	268	322	830	1,110	1,480	2,310	1,010	315	224
24	295	250	285	262	320	860	1,040	1,560	2,310	1,010	318	224
25	290	248	280	285	312	890	1,010	1,520	2,260	920	315	236
26	290	245	275	252	312	775	1,010	1,560	1,990	830	308	240
27	292	245	265	285	318	675	920	1,940	1,990	725	300	210
28	292	252	255	292	325	700	890	2,360	2,040	652	295	232
29	295	250	262	270	....	750	960	2,260	2,040	585	288	226
30	312	222	252	270	....	675	890	2,400	1,990	545	288	224
31	305	....	255	260	....	608	....	2,800	....	505	305	....

NOTE.—Discharge determined from a well-defined rating curve. Recorder not working properly January 24–28 and June 27–29; discharge estimated from sketched-in gage-height graph.

Monthly discharge of Kern River near Kernville, Cal., for the year ending Sept. 30, 1915.

Month.	Discharge in second feet.			Run-off (total in acre-feet).	Accuracy.
	Maximum.	Minimum.	Mean.		
October	407	290	319	19,600	A.
November	288	222	259	15,400	B.
December	295	226	263	16,200	B.
January	308	252	276	17,000	B.
February	397	222	318	17,700	A.
March	890	318	529	32,500	A.
April	1,360	652	938	55,800	A.
May	2,800	775	1,400	86,100	A.
June	3,680	1,990	2,580	154,000	A.
July	2,040	505	1,170	71,900	A.
August	488	288	371	22,800	A.
September	320	224	260	15,500	B.
The year	3,680	222	724	524,000	

KERN RIVER NEAR BAKERSFIELD, CAL.[1]

Location.—In sec. 2, T. 29 S., R. 28 E., at mouth of lower canyon, 5 miles northeast of Bakersfield, Kern County.

Drainage area.—2,345 square miles.

Records available.—January 1, 1894, to June 30, 1907, and March 1, 1908, to September 30, 1915.

Gage.—Water-stage recorder at footbridge.

Discharge measurements.—Made from footbridge at gage.

Channel and control.—Sand and shifting.

Extremes of discharge.—Maximum stage during year from water-stage recorder, 6.16 feet at 1.55 p. m. June 10 (discharge, 4,249 second-feet); minimum discharge, 225 second-feet September 24.

1896–1915: Maximum stage recorded January 26, 1914 (discharge, 18,300 second-feet); minimum stage recorded September 15, 1898 (discharge, 80 second-feet).

Diversions.—Several small diversions on main river and South Fork for irrigation. Water diverted at and below Kernville for power development is returned to the river above the station.

Regulation.—No information.

Accuracy.—Results good.

Cooperation.—Complete record furnished by Kern County Land Co. through A. K. Warren, engineer.

The following discharge measurement was made by H. J. Tompkins:

October 11, 1914: Gage height, 3.97 feet; discharge, 386 second-feet.

Daily discharge, in second-feet, of Kern River near Bakersfield, Cal., for the year ending Sept. 30, 1915.

Day.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.
1	511	354	307	347	509	510	943	1,621	3,570	2,082	588	298
2	486	371	294	344	460	551	989	1,556	3,967	2,095	544	313
3	458	370	311	341	537	538	1,109	1,489	3,698	2,029	532	308
4	446	361	323	352	533	520	1,230	1,468	3,284	2,042	518	304
5	438	369	355	355	440	522	1,280	1,616	3,008	1,954	517	320
6	431	361	339	364	452	542	1,245	1,595	2,998	1,693	506	315
7	429	361	322	368	501	551	1,111	1,639	3,165	1,447	491	302
8	418	360	295	367	520	556	1,083	1,707	3,491	1,272	489	291
9	393	355	294	363	541	552	1,079	1,705	3,873	1,283	479	284
10	424	366	304	365	613	547	1,078	1,699	4,010	1,384	455	275
11	422	375	324	347	618	535	1,164	1,739	3,862	1,452	437	288
12	417	364	343	348	608	532	1,320	1,799	3,540	1,502	422	326
13	396	352	325	346	564	542	1,475	1,986	2,997	1,481	412	317
14	377	355	327	352	486	574	1,543	2,062	2,751	1,386	401	297
15	374	357	317	364	507	623	1,382	1,950	2,675	1,273	386	293
16	375	359	384	376	511	689	1,284	1,952	2,761	1,144	382	295
17	368	351	359	356	615	825	1,224	2,174	2,761	1,075	371	282
18	368	347	379	341	684	906	1,270	2,789	2,678	1,103	364	272
19	369	340	396	347	656	948	1,486	2,559	2,666	1,022	352	260
20	367	328	379	365	623	995	1,698	2,278	2,362	953	327	255
21	371	312	381	377	604	1,011	1,860	2,064	2,311	966	311	248
22	378	309	369	388	570	1,048	1,867	2,002	2,395	923	310	243
23	387	307	373	383	515	1,102	1,702	2,016	2,415	981	326	236
24	385	316	380	372	534	1,170	1,560	2,086	2,362	1,012	322	228
25	370	312	390	369	536	1,209	1,463	2,088	2,382	984	329	234
26	366	314	394	385	524	1,220	1,454	2,049	2,341	936	324	240
27	364	301	391	371	504	1,104	1,432	2,105	2,099	824	311	250
28	358	313	397	374	489	992	1,418	2,466	2,144	804	316	245
29	359	318	378	341	....	1,029	1,431	2,717	2,183	711	314	243
30	366	324	364	433	....	1,055	1,616	2,745	2,130	647	307	239
31	359	....	359	443	....	972	....	3,055	....	610	295	....

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[1] Station also known as at "first point of measurement."

Monthly discharge of Kern River near Bakersfield, Cal. for the year ending Sept. 30, 1915.

Month.	Discharge in second-feet.			Run-off (total in acre-feet).
	Maximum.	Minimum.	Mean.	
October	518	328	398	24,500
November	383	298	343	20,400
December	407	285	348	21,400
January	458	279	366	22,500
February	710	425	545	30,300
March	1,283	470	789	48,500
April	1,907	920	1,360	80,900
May	3,440	1,437	2,025	124,500
June	4,249	1,991	2,896	172,300
July	2,228	594	1,260	77,500
August	605	284	401	24,700
September	337	225	277	16,500
The year	4,249	225	917	664,000

NOTE.—Maximum and minimum monthly and yearly discharge are absolute extremes of discharge determined from the water-stage recorder. Run-off in acre-feet computed by U. S. Geological Survey.

ERSKINE CREEK NEAR BODFISH, CAL.[1]

LOCATION.—In the SW. ¼ SW. ¼ sec. 24, T. 27 S., R. 33 E., 700 feet west of Otto Liebel's residence, about 6 miles southeast of Bodfish, Kern County, and 8 miles southeast of Isabella. Previous to March 28, 1913, this station was located at about 4 miles downstream in the NW. ¼ sec. 9, T. 27 S., R. 33 E., at ford at mouth of canyon, 2¾ miles above junction with Kern River, 3 miles east of Bodfish, and 5 miles south of Isabella.

DRAINAGE AREA.—Not measured.

RECORDS AVAILABLE.—February 7, 1911, to September 30, 1915 (fragmentary).

GAGE.—Vertical staff on left bank; read occasionally by Otto Liebel. Gage at old location was vertical staff on left bank fastened to willow tree, about 80 feet above ford.

DISCHARGE MEASUREMENTS.—Made by wading near gage.

CHANNEL AND CONTROL.—Sand and gravel.

EXTREMES OF STAGE.—Maximum stage recorded during year, 1.92 feet May 1 and 7; minimum stage recorded, 1.30 feet July 31 and August 7, 14, 21, and 28.

1912-1915: Maximum stage recorded, 3.85 feet January 25, 1914; minimum stage recorded, 1.2 feet during the low water of 1912 and 1913.

DIVERSIONS.—A small ditch diverts water for irrigation about 5 miles upstream.

REGULATION.—No information.

COOPERATION.—Gage-height record furnished by United States Forest Service.

Data inadequate for estimates of discharge.

No discharge measurements were made at this station during the year.

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[1] Known formerly as "near Isabella."

Daily gage-height, in feet, of Erskine Creek near Bodfish, Cal., for the year ending Sept. 30, 1915.

Day.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.
1								1.92				
2				1.75								
3	1.38						1.85			1.42		
4												1.32
5			1.60						1.72			
6		1.45			1.80	1.80						
7								1.92			1.30	
8												
9				1.78								
10	1.38						1.88			1.38		
11									1.68			1.32
12			1.68									
13		1.48			1.80	1.80						
14											1.30	
15												
16				1.78								
17	1.40						1.90			1.35		
18												1.35
19			1.70						1.52			
20					1.80	1.80						
21		1.50	1.75								1.30	
22								1.88				
23				1.78								
24	1.42						1.88			1.35		
25												1.35
26			1.78						1.48			
27					1.80	1.82						
28		1.55						1.80			1.30	
29												
30				1.80								
31	1.42									1.30		

TULARE LAKE BASIN.

TULARE LAKE IN KINGS COUNTY, CAL.

Location.—At quarter corner between secs. 8 and 17, T. 21 S., R. 20 E., at headgate at corner of north-south and east-west levies on G. Albert Smith ranch, about 5 miles southwest of Stratford.

Drainage area.—Not measured.

Records available.—March 15, 1906, to September 30, 1915 (incomplete). All published records give actual depth of water on the lowest point of the lake bed.

Gage.—Vertical staff in two sections fastened to the headgate. It is read about once a week by Mrs. E. G. Kolbenstetter. Gage readings reduced to depth of water from the following data: Elevation of bottom of lake, 179.1 feet above mean sea level; elevation of zero of gage, 176.4 feet.

During 1906 and a part of 1907 the readings were made from a gage near the entrance of Kings River near Lemoore, at the middle of sec. 4, T. 21 S., R. 20 E. The zero of that gage was at 175.1 feet elevation. May 11, 1907, a staff gage was set near Corcoran, with its datum at the same elevation, and was used until July 30, 1909. July 28, 1910, a vertical staff was installed on the section line just south of the corner to secs. 27, 28, 33, and 34, T. 20 S., R. 20 E., about 10 miles south of Lemoore, near Stratford post office. The elevation of the zero of this gage was 171.0 feet. On August 20, 1913, a vertical staff in four sections was installed in main north and south waterway, 4 to 6 miles southeast of Startford. Its zero was also at elevation 171.0 feet. Sections No. 1 and No. 2 were 1 mile south of 1910 gage in sec. 3, T. 21 S., R. 20 E. No. 3 was in sec. 10 and No. 4 was was in soc. 15, 1 and 2 miles, respectively, south of sections No. 1 and No. 2

The present gage was installed May 15, 1914, on account of the rebuilding of the levees.

Extremes of stage.—Maximum depth recorded during year, 3.8 feet June 20; minimum depth recorded, −0.65 feet December 18. Negative depths show all water in the channels and below the bottom of the lake.

1906–1915: Maximum depth, 14.0 feet June 21, 1907; the lake was empty for a period in 1906 and from the later part of October to the later part of December, 1914.

The lake is roughly rectangular in shape and its greatest length is from northwest to southeast. In November, 1907, when its margin was carefully determined, the lake had an area of about 274 square miles, a maximum depth of 12.4 feet, an average length of 20 miles, and a width of 13.5 miles; the water's edge was 3 miles from the town of Corcoran, and the water surface about 12 feet below.

The lake bed resembles a flat saucer. The flat, level area in the bottom is approximately 180 feet above mean sea level and covers about 55 square miles. The lowest point on the crest of the delta ridge to the north is about 27 feet higher than the bottom of the lake. Natural outflow will not occur, therefore, until the lake has a maximum depth of nearly 30 feet and an area of nearly 1,000 square miles.

Depth, in feet, of Tulare Lake in Kings County, Cal., for the year ending Sept. 30, 1915.

Day.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.
1											2.6	
2												
3					0.45							
4	0.95						0.95					
5												
6												
7			−0.55									
8												
9								1.05				
10												
11							.65			3.15		
12	.75											1.3
13									3.6			
14												
15												
16											1.9	
17				0.55								
18	.25		−.65			1.05						
19												
20							.45		3.8	3.0		1.2
21												
22		−0.35										
23								1.8				
24						1.05						
25							.25					
26	−.05											1.05
27				.45								
28												
29		−.45									1.6	
30								1.9	3.4			
31			+.65									

Note.—Negative depths show all water in channels and below bottom of lake.

DEER CREEK AT HOT SPRINGS, CAL.

Location.—Below footbridge at forest supervisor's headquarters in Sequoia National Forest, about half a mile below Hot Springs, Tulare County. Tyler Creek enters about 2½ miles below the station.

Drainage area.—Not measured.

Records available.—October 7, 1910, to September 30, 1915.

Gage.—Vertical staff fastened to an alder tree on left bank 30 feet downstream from footbridge; read once a day by A. B. Patterson.

Discharge measurements.—Made from highway bridge 100 feet below gage or by wading.

Channel and control.—Sand, gravel. and boulders.

Extremes of discharge.—Maximum stage recorded during year, 1.75 feet at 5 p. m. May 4 (discharge, 81 second-feet); minimum stage recorded, 0.31 foot at 3.30 p. m. October 1 (discharge, 1.3 second-feet).

1910–1915: Maximum stage recorded, 2.9 feet at 10 a. m. January 24, 1914 (discharge, about 230 second-feet, determined from extension of rating curve); minimum stage recorded, 0.24 foot August 14 to 16, 1913 (discharge, 0.8 second-foot).

Diversions.—Water is diverted for irrigation above the station.

Regulation.—No information.

Accuracy.—Results for high stages subject to error, and fair for medium and low stages. No discharge measurements were made at this station during the years ending September 30, 1914 and 1915. A measurement made in 1916 was used to help define the curve.

Cooperation.—Gage-height record furnished by United States Forest Service.

Daily discharge, in second-feet, of Deer Creek at Hot Springs, Cal., for the year ending Sept. 30, 1915.

Day.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.
1	1.3	4.0	4.0	6.8	9.8	12	13	32	42	16	5.8	[a]2.5
2	2.5	4.0	4.4	[a]6.7	18	[a]12	14	[a]36	42	14	5.6	2.5
3	2.5	4.4	5.4	[a]6.5	[a]14	12	14	39	42	14	5.1	2.5
4	2.9	[a]4.0	6.3	[a]6.3	[a]12	12	14	56	39	14	3.4	2.5
5	2.9	[a]3.7	[a]5.6	6.1	9.8	11	17	50	[a]38	14	4.4	[a]2.5
6	2.5	3.4	4.9	6.6	8.3	9.8	14	42	36	13	4.0	2.5
7	2.2	[a]3.4	4.4	6.3	8.0	9.8	14	42	[a]35	10	2.7	2.5
8	2.2	3.4	4.4	6.3	8.0	9.8	14	46	34	10	[a]2.8	2.5
9	2.2	[a]3.7	4.4	6.3	14	9.8	13	42	33	10	2.9	[a]2.5
10	2.5	4.0	5.8	6.3	13	9.8	14	42	33	10	[a]2.9	2.5
11	2.5	4.0	7.4	6.3	16	9.8	14	42	25	10	2.9	4.4
12	2.5	4.0	6.8	6.8	11	9.8	14	39	24	10	[a]3.1	3.4
13	2.5	4.0	6.8	[a]6.8	9.8	9.8	17	36	24	9.8	[a]3.2	2.9
14	2.2	4.0	5.6	17	9.8	9.8	14	[a]37	[a]23	9.2	3.4	[a]3.2
15	2.2	4.0	5.8	6.3	9.2	9.8	13	[a]38	22	8.3	[a]3.6	3.4
16	2.2	4.0	5.6	5.8	17	11	13	39	23	7.4	3.8	[a]3.2
17	2.2	4.0	6.8	[a]5.4	16	11	13	76	[a]20	7.4	[a]3.7	3.1
18	[a]2.4	3.6	6.8	4.9	13	13	16	66	18	7.4	[a]3.6	2.9
19	2.5	3.4	6.8	4.9	14	13	15	58	[a]18	[a]7.1	[a]3.5	2.5
20	2.5	3.4	6.8	4.9	12	13	16	54	[a]17	[a]6.8	[a]3.4	2.5
21	6.3	3.4	6.8	5.1	13	13	18	[a]51	17	[a]6.5	[a]3.3	2.5
22	4.0	3.4	6.8	5.1	11	14	32	[a]48	[a]17	[a]6.2	[a]3.2	[a]2.5
23	[a]3.7	3.4	6.8	5.1	11	16	23	46	[a]16	[a]5.8	[a]3.1	2.5
24	3.4	3.4	6.8	6.3	12	17	20	[a]44	[a]15	[a]5.5	[a]3.0	[a]2.5
25	3.4	3.4	6.8	6.3	11	16	18	42	[a]14	[a]5.2	[a]2.9	[a]2.5
26	2.5	3.4	6.8	6.3	11	14	19	42	14	4.9	[a]2.8	[a]2.5
27	2.5	3.4	6.8	6.3	11	13	20	[a]42	14	[a]5.0	[a]2.7	[a]2.5
28	2.5	3.6	6.8	6.8	13	25	22	42	15	[a]5.0	[a]2.6	[a]2.5
29	3.4	4.0	6.8	9.8	....	[a]31	50	46	15	[a]5.0	2.5	[a]2.5
30	4.0	4.0	6.8	12	....	14	42	[a]44	14	5.1	2.5	[a]2.5
31	4.0	....	6.8	10	....	13	....	42	....	5.8	2.5	....

[a] Estimated by comparison with record of flow of South Fork of Tule River near Portersville; gage not read.

Note.—Discharge determined from a rating curve fairly well defined between 5 and 50 second-feet.

Monthly discharge of Deer Creek at Hot Springs, Cal., for the year ending Sept. 30, 1915.

Month.	Discharge in second-feet.			Run-off (total in acre-feet).	Accuracy.
	Maximum.	Minimum.	Mean.		
October	6.3	1.3	2.81	173	D.
November	4.4	3.4	3.73	222	D.
December	7.4	4.0	6.12	376	C.
January	17	4.9	6.85	421	C.
February	18	8.0	12.0	666	C.
March	31	9.8	13.0	799	C.
April	50	13	18.3	1,090	C.
May	76	32	45.2	2,780	C.
June	42	14	24.6	1,460	C.
July	16	4.9	8.66	532	D.
August	5.8	2.5	3.38	208	
September	4.4	2.5	2.72	162	
The year	76	1.3	12.3	8,890	

TULE RIVER NEAR PORTERSVILLE, CAL.

Location.—In the NW. ¼ NW. ¼ sec. 25, T. 21 S., R. 28 E., below highway bridge near McFarland ranch, about 1 mile above mouth of South Fork, and 6 miles east of Portersville, Tulare County. The North and Middle forks of the Tule River unite about 9 miles above the station.

Drainage area.—266 square miles.

Records available.—May 1, 1901, to September 30, 1915.

Gage.—Staff in four sections on right bank 75 feet below bridge; sections Nos. 1, 3, and 4 are vertical; No. 2 is inclined. Original gage was on the same bank 200 feet below bridge and at same datum. There have been several changes in the number and kinds of staff sections, but the same datum has been maintained. Gage read once a day by Mrs. Martha Brough.

Discharge measurements.—Made from bridge above gage or by wading. Bridge measurements are corrected for angle to current.

Channel and control.—Gravel and small boulders; shifts slightly during high water. Left bank is low and wooded and subject to overflow above a stage of about 6 feet.

Extremes of discharge.—Maximum stage recorded during year, 5.3 feet at 11 p. m. May 4 (discharge, 1,740 second-feet); minimum stage recorded, 0.60 foot August 20 to September 1 (discharge, 8.0 second-feet).

1901–1915: Maximum stage recorded, 10.8 feet at 12 p. m. January 25, 1914 (discharge, about 6,600 second-feet, computed from extension of rating curve); minimum stage recorded, 0.2 foot August 22, 1913 (discharge, 1 second-foot).

Diversions.—Several small irrigation ditches divert water above the station.

Regulation.—Power is developed upon the Middle Fork and upon the North and South forks of the Middle Fork.

Accuracy.—Results good.

Discharge measurements of Tule River near Portersville, Cal., during the year ending Sept. 30, 1915.

[Made by R. C. Rice.]

Date.	Gage height.	Discharge.
	Feet.	*Sec.-ft.*
Oct. 18	0.73	16
Feb. 1	1.61	108

Daily discharge, in second-feet, of Tule River near Portersville, Cal., for the year ending Sept. 30, 1915.

Day.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.
1	9.2	20	24	48	105	183	173	505	545	113	26	8.0
2	9.2	20	24	48	325	173	224	470	505	105	24	8.6
3	9.2	20	26	48	173	137	224	435	435	98	21	9.2
4	9.2	20	30	105	137	137	203	1,380	370	94	19	9.2
5	9.8	20	30	59	121	129	213	715	370	91	17	9.2
6	10	20	30	71	121	129	193	625	370	88	15	9.2
7	12	20	34	65	113	121	213	470	385	84	14	9.2
8	13	20	38	77	113	121	235	435	385	81	13	11
9	14	20	38	91	355	113	183	470	370	78	13	11
10	14	20	41	88	235	113	235	505	340	77	13	11
11	14	20	55	84	325	113	224	545	310	75	13	11
12	14	20	53	77	183	110	224	545	310	71	13	11
13	14	20	48	77	169	105	310	545	272	65	13	11
14	14	20	43	77	137	113	260	545	260	59	13	11
15	14	20	43	75	121	129	213	505	248	53	12	11
16	14	20	43	72	173	173	193	470	235	48	11	11
17	14	20	43	65	235	203	213	1,100	224	48	10	11
18	16	20	53	59	193	213	235	980	213	43	9.8	11
19	17	20	48	53	155	193	235	920	213	43	9.2	11
20	17	20	47	53	164	224	260	865	213	43	8.0	11
21	17	20	46	51	235	235	285	670	203	34	8.0	11
22	18	20	45	51	173	235	325	585	193	33	8.0	11
23	18	20	43	51	155	248	298	545	173	30	8.0	11
24	19	20	43	51	146	260	260	525	173	27	8.0	11
25	19	20	43	51	146	224	224	505	155	27	8.0	11
26	20	21	43	77	146	224	224	488	155	27	8.0	11
27	20	21	43	53	137	164	203	470	137	27	8.0	11
28	20	22	48	55	121	164	213	505	129	27	8.0	11
29	20	23	48	91	......	260	355	505	119	27	8.0	11
30	20	24	48	224	......	224	670	505	118	27	8.0	11
31	20	......	48	121	......	173	......	525	......	27	8.0	......

NOTE.—Discharge determined from a fairly well defined rating curve.

Monthly discharge of Tule River near Portersville, Cal., for the year ending Sept. 30, 1915.

Month.	Discharge in second-feet.			Run-off (total in acre-feet).	Accuracy.
	Maximum.	Minimum.	Mean.		
October	20	9.2	15.1	928	B.
November	24	20	20.4	1,210	B.
December	55	24	41.6	2,560	B.
January	224	48	73.2	4,500	B.
February	355	105	175	9,720	B.
March	260	105	172	10,600	B.
April	670	173	251	14,900	B.
May	1,380	435	608	37,400	B.
June	545	118	271	16,100	B.
July	113	27	57.1	3,510	B.
August	26	8.0	12.1	744	B.
September	11	8.0	10.5	625	B.
The year	1,380	8.0	142	103,000	

BEAR CREEK NEAR SPRINGVILLE, CAL.

Location.—At Bear Creek ranger station, about 150 feet above mouth of Rancheria Creek, 2¾ miles above junction with North Fork of Tule River, and 6 miles northeast of Springville, Tulare County.

Drainage area.—Not measured.

Records available.—January 23, 1911, to September 30, 1915, (not complete).

Gage.—Vertical staff fastened to a sycamore tree on right bank about 600 feet southwest of ranger station; read once a day, occasionally, by W. F. Derby.

Discharge measurements.—Made by wading.

Channel and control.—Sand, gravel, and boulders; fairly permanent.

Extremes of discharge.—Maximum stage recorded during year, 3.00 feet at 5 p. m. May 4 (discharge, 87 second-feet); minimum stage recorded, 0.45 foot at 1 p. m. August 13 (discharge, 0.4 second-foot).

1911–1915: Maximum stage recorded, 5.6 feet at 11 p. m. January 25, 1914 (discharge, 295 second-feet); minimum stage recorded, 0.30 foot September 17, 1913 (discharge, 0.1 second-foot.)

Diversions.—A small irrigation ditch heads about 300 feet above the station.

Regulation.—None.

Accuracy.—Results subject to considerable error because of infrequent gage readings.

Cooperation.—Gage-height record furnished by United States Forest Service.

The following discharge measurement was made by R. C. Rice:

February 1, 1915: Gage height, 1.09 feet; discharge, 5.1 second-feet.

Daily discharge, in second-feet, of Bear Creek near Springville, Cal., for the year ending Sept. 30, 1915.

Day.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.
1	[a]0.8	1.4	1.5	2.1	[a]5.2	9.3	[a]8.6	[a]39	[a]19	[a]4.2	[a]1.5	0.6
2	.8	1.4	1.6	2.1	[a]58	[a]8.6	9.0	[a]44	19	4.2	1.4	.6
3	.8	[a]1.4	1.6	2.1	35	[a]5.1	9.0	44	19	4.2	1.4	.6
4	.8	1.4	[a]1.7	[a]4.3	29	4.9	8.6	[a]87	19	[a]4.2	1.3	.6
5	[a]1.0	1.4	1.7	3.0	25	4.7	8.6	60	19	4.0	1.2	.6
6	1.0	1.4	1.7	[a]2.4	25	4.6	[a]8.6	48	[a]19	3.8	1.2	[a].6
7	1.0	1.4	1.8	3.5	21	4.5	9.0	44	17	3.6	[a]1.1	.6
8	1.0	1.4	1.9	[a]30.0	21	[a]4.4	8.6	42	15	3.4	.9	.6
9	1.0	1.4	2.0	5.0	[a]30	4.3	8.6	[a]39	13	3.2	.8	.6
10	1.0	1.4	[a]2.1	3.0	[a]6.8	4.3	[a]8.6	37	11	3.0	.7	[a].6
11	1.0	1.4	2.4	3.0	[a]7.7	[a]4.2	8.6	35	9.0	2.8	.6	.6
12	1.0	1.4	2.2	[a]3.0	6.0	4.1	8.6	33	[a]8.6	2.6	.5	.6
13	1.0	1.4	2.1	3.0	5.5	4.1	8.6	[a]34	8.4	2.4	[a].4	.6
14	1.0	1.4	2.1	2.9	5.5	4.2	[a]8.6	33	8.2	[a]2.3	.4	.6
15	1.0	1.4	2.1	[a]2.9	5.5	5.6	8.6	32	8.0	2.3	.5	.6
16	[a]1.0	1.4	2.1	2.9	[a]5.3	[a]8.6	8.6	33	[a]7.9	2.3	.5	.6
17	1.0	1.4	2.1	2.9	10	8.1	8.8	[a]44	7.5	2.3	.5	.6
18	[a]1.0	1.4	2.2	2.9	10	7.6	[a]8.6	50	7.1	[a]2.3	.6	.6
19	1.0	1.4	2.1	2.9	15	7.2	8.6	45	[a]6.8	2.2	[a].6	.6
20	1.1	1.4	2.1	2.9	[a]26	[a]6.8	9.0	40	6.8	2.2	.6	.6
21	[a]1.2	1.4	2.1	2.9	[a]6.8	[a]11	[a]13	40	6.8	2.1	.6	.6
22	1.2	[a]1.4	2.1	2.9	6.8	11	20	40	6.8	2.0	[a].6	[a].6
23	1.2	1.4	[a]2.1	2.9	6.8	12	[a]9.7	[a]39	[a]6.8	2.0	.6	.6
24	[a]1.2	1.4	2.1	2.9	[a]6.8	13	9.7	35	6.4	1.9	.6	.6
25	1.2	1.4	2.1	[a]3.2	6.8	[a]6.8	9.7	31	6.0	1.9	.6	.6
26	1.2	1.4	2.1	3.0	6.7	6.8	9.7	27	5.6	1.8	.6	.6
27	1.3	1.4	2.1	3.0	6.6	15	[a]9.7	[a]24	[a]5.3	1.8	.6	.7
28	1.3	[a]1.4	2.1	4.0	[a]6.6	[a]61	9.7	22	4.9	1.7	.6	.8
29	1.4	1.4	2.1	4.3	....	7.0	[a]32	20	4.5	1.7	.6	.9
30	[a]1.5	[a]1.5	[a]2.1	[a]2.4	....	6.9	44	[a]19	[a]4.2	[a]1.6	.6	[a]1.0
31	[a]1.4	....	2.1	3.8	....	[a]6.8	....	19	....	1.6	.6	....

[a] From gage height reading.

Note.—Discharge for days when gage was read determined from a rating curve well defined between 5 and 60 second-feet. Discharge for other days estimated by comparison with records of flow of South Fork of Tule River and Tule River near Portersville and from U. S Weather Bureau rainfall record at Milo and Springville.

Monthly discharge of Bear Creek near Springville, Cal., for the year ending Sept. 30, 1915.

Month.	Discharge in second-feet.			Run-off (total in acre-feet).
	Maximum.	Minimum.	Mean.	
October	1.5	0.8	1.08	66
November	1.5	1.4	1.40	83
December	2.4	1.5	2.01	124
January	30	2.1	3.94	242
February	58	5.2	14.5	805
March	61	4.1	8.79	540
April	44	8.6	11.4	678
May	87	19	38.0	2,340
June	19	4.2	10.2	607
July	4.2	1.6	2.63	162
August	1.5	.4	.75	46
September	1.0	.6	.63	37
The year	87	.4	7.91	5,730

SOUTH FORK OF TULE RIVER NEAR PORTERSVILLE,[1] CAL.

Location.—Opposite Indian school on Tule Indian Reservation, 2 miles below the mouth of Rocky Creek, 7 miles southeast of Success, about 8 miles above junction with Tule River, and 14 miles southeast of Portersville, Tulare County.

Drainage area.—Not measured.

Records available.—October 10, 1910, to September 30, 1915.

Gage.—Vertical staff fastened to an alder tree on left bank 100 feet above pump house; read once a day by A. P. Edmonson.

Discharge measurements.—Made from car and cable half a mile below gage or by wading.

Channel and control.—Rough; composed of boulders and gravel; shifts slightly during high water. Both banks are high and not subject to overflow.

Extremes of discharge.—Maximum stage recorded during year, 3.0 feet at 9 a. m. and 5 p. m. May 18 (discharge, 452 second-feet); minimum stage recorded, 0.3 foot October 1 to 6 (discharge, 2.5 second-feet).

1910–1915: Maximum stage recorded, 8.0 feet at 8. m. January 26 1914 (discharge, about 2,750 second-feet, computed from extension of rating curve based upon discharge measurements made in 1916, the stage of the highest measurement being 3.8 feet); minimum stage recorded, 0.0 foot August 4–16, 18–26; September 11–22; and October 1, 1913 (discharge, 1 second-foot).

Diversions.—Several small irrigation ditches (total capacity about 12 second-feet) divert water above the station.

Regulation.—None.

Accuracy.—Results good. Measurements made since the close of the year have defined the curve up to stage, 4.0 feet.

Cooperation.—Gage-height record furnished by United States Indian Service.

Discharge measurements of South Fork of Tule River near Portersville, Cal., during the year ending Sept. 30, 1915.

[Made by R. C. Rice.]

Date.	Gage height.	Discharge.	Date.	Gage height.	Discharge.
	Feet.	*Sec.-ft.*		*Feet.*	*Sec.-ft.*
Oct. 17	0.40	4.3	Jan. 30	1.18	42

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[1] Originally known as "near Success."

Daily discharge, in second-feet, of South Fork of Tule River near Portersville, Cal., for the year ending Sept. 30, 1915.

Day.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.
1	2.5	[a]6.8	[a]7.8	12	37	64	53	288	163	37	10	4.3
2	2.5	[a]6.8	[a]8.9	12	91	58	53	232	143	37	10	4.3
3	2.5	[a]6.8	10	18	53	53	53	232	143	37	10	4.3
4	2.5	[a]6.8	14	18	45	53	53	350	124	37	10	4.3
5	2.5	6.8	[a]14	18	37	53	53	318	107	37	10	4.3
6	2.5	6.8	14	18	37	49	53	259	91	37	6.8	4.3
7	4.3	[a]6.8	14	18	29	49	76	232	84	37	6.8	4.3
8	4.3	[a]6.8	14	18	29	49	58	232	76	37	6.8	4.3
9	4.3	6.8	[a]15	18	70	37	53	232	76	29	6.8	4.3
10	4.3	[a]6.8	16	23	58	37	53	232	76	23	6.8	4.3
11	4.3	[a]6.8	18	23	91	37	53	208	76	23	6.8	4.3
12	4.3	6.8	[a]16	23	45	37	53	208	64	23	6.8	4.3
13	4.3	6.8	14	23	45	37	53	185	64	23	6.8	4.3
14	5.6	6.8	[a]13	25	45	53	53	185	64	18	6.8	4.3
15	5.6	[a]6.8	[a]13	23	37	49	53	185	64	18	6.8	4.3
16	5.6	[a]6.8	12	23	37	49	53	208	64	18	6.8	4.3
17	4.3	6.8	14	23	37	53	64	232	53	18	6.8	4.3
18	[a]5.4	[a]6.8	14	18	53	53	53	452	53	18	6.8	4.3
19	[a]6.6	[a]6.8	14	18	53	53	53	350	53	18	6.8	4.3
20	[a]7.7	6.8	[a]14	[a]18	91	53	64	288	53	18	6.8	4.3
21	[a]8.9	6.8	14	[a]18	53	53	76	259	53	18	6.8	4.3
22	10	[a]6.8	14	[a]18	49	53	124	232	53	18	6.8	4.3
23	8.4	6.8	[a]14	18	53	53	76	208	45	18	6.8	4.3
24	6.8	[a]6.8	[a]14	18	53	53	76	208	45	18	6.8	4.3
25	6.8	6.8	14	23	53	53	64	185	45	14	6.8	4.3
26	6.8	[a]6.8	14	18	53	53	64	163	45	14	6.8	4.3
27	[a]6.6	6.8	12	23	53	53	64	163	45	10	6.8	4.3
28	6.3	[a]6.8	12	29	53	64	64	163	45	10	6.8	4.3
29	5.6	[a]6.8	[a]12	45	......	91	143	163	37	10	4.3	4.3
30	5.6	6.8	12	53	......	53	318	163	37	10	4.3	4.3
31	6.8	......	12	45	......	53	......	163	......	10	4.3	......

[a] Interpolated.

NOTE.—Discharge determined from a rating curve well defined below 60 second-feet, and fairly well defined above 60 second-feet.

Monthly discharge of South Fork of Tule River near Portersville, Cal., for the year ending Sept. 30, 1915.

Month.	Discharge in second-feet.			Run-off (total in acre-feet).	Accuracy.
	Maximum.	Minimum.	Mean.		
October	10	2.5	5.31	326	B.
November	6.8	6.8	6.80	405	B.
December	18	7.8	13.3	818	B.
January	53	12	23.4	1,440	B.
February	91	29	51.4	2,850	B.
March	91	37	51.9	3,190	B.
April	318	53	72.6	4,320	B.
May	452	163	232	14,300	B.
June	163	37	71.4	4,250	B.
July	37	10	22.4	1,380	B.
August	10	4.3	7.07	435	B.
September	4.3	4.3	4.30	256	B.
The year	452	2.5	46.8	34,000	

KAWEAH RIVER NEAR THREE RIVERS, CAL.

Location.—In the SE. ¼ sec. 27, T. 17 S., R. 28 E., to J. O. Carter's ranch, 1¼ miles southwest of Three Rivers, Tulare County. South Fork enters three-fourths mile and North Fork 3 miles above the station.

Drainage area.—520 square miles.

Records available.—April 29, 1903, to September 30, 1915.

Gage.—United States Weather Bureau gage in three sections on left bank a few feet above cable and one-fourth mile back of observer's house. The original gage was installed by the United States Geological Survey at same location and datum. On December 5, 1912, the Weather Bureau gage was installed. For about two years the two gages were read interchangeably, according to varying conditions of repair of each. On October 19, 1914, the Geological Survey repaired the upper section of the Weather Bureau gage and has used this gage since. Gage read twice a day by J. O. Carter.

Discharge measurements.—Made from car and cable at gage or by wading.

Channel and control.—Gravel and boulders; fairly permanent.

Extremes of discharge.—Maximum stage recorded during year, 8.6 feet at 5 a. m. June 1 (discharge, 3,600 second-feet); minimum stage recorded, 4.45 feet at 6 p. m. September 24 and 25 (discharge, 42 second-feet).

1903–1915: Maximum stage recorded, 13.0 feet at 10 p. m. January 25, 1914 (discharge, about 13,300 second-feet, computed from extension of rating curve); minimum stage recorded, 4.35 feet August 22, 1914 (discharge, 30 second-feet).

Diversions.—Several small ditches divert water for local irrigation and domestic use above the station.

Regulation.—Power is developed on the Middle and East forks but effect is thought to be small.

Accuracy.—Results good.

Discharge measurements of Kaweah River near Three Rivers, Cal., during the year ending Sept. 30, 1915.

Date.	Made by—	Gage height.	Discharge.
		Feet.	*Sec.-ft.*
Oct. 19	R. C. Rice	4.60	63
June 10	H. J. Tompkins	7.82	2,540

Daily discharge, in second-feet, of Kaweah River near Three Rivers, Cal., for the year ending Sept. 30, 1915.

Day.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1	79	67	57	83	239	324	545	1,120	3,280	980	175	63
2	73	79	56	83	490	284	605	980	2,290	938	172	73
3	73	73	56	83	324	260	670	938	1,920	980	160	73
4	73	73	87	136	268	268	740	1,260	1,920	895	145	73
5	73	79	83	115	242	260	740	1,360	1,920	815	154	63
6	73	67	77	105	260	260	605	1,160	2,160	638	142	67
7	73	63	71	101	232	253	605	1,220	2,550	605	139	63
8	73	63	71	105	222	246	605	1,320	2,550	638	133	56
9	73	63	73	110	705	242	705	1,160	2,550	670	125	54
10	67	63	83	105	545	242	705	1,220	2,420	670	115	57
11	63	63	83	105	362	239	855	1,360	2,160	638	115	56
12	63	57	85	105	332	239	1,020	1,580	1,920	605	105	56
13	63	56	83	105	292	232	1,260	2,160	1,690	545	105	60
14	63	56	83	211	276	256	895	1,580	1,690	518	105	60
15	60	59	83	184	268	320	740	1,580	1,690	490	103	63
16	56	57	83	136	358	385	740	1,920	1,690	462	105	57
17	56	54	101	112	545	518	815	2,550	1,690	410	96	60
18	56	52	94	110	410	490	1,070	2,040	1,690	385	94	60
19	63	52	87	110	340	545	1,220	1,920	1,470	362	90	51
20	63	51	85	110	462	605	1,360	1,580	1,470	362	79	48
21	73	48	83	110	362	670	1,260	1,470	1,470	332	79	48
22	105	48	83	110	332	705	1,070	1,470	1,420	362	77	48
23	83	48	83	108	324	778	1,070	1,690	1,360	362	79	47
24	77	48	87	105	300	778	895	1,690	1,360	300	77	45
25	77	48	85	136	304	815	895	1,580	1,260	268	75	45
26	75	48	83	120	300	605	895	1,690	1,160	253	75	48
27	73	48	83	125	276	518	815	2,160	1,160	236	67	56
28	60	51	83	197	284	545	855	2,420	1,120	204	65	54
29	63	56	83	300	......	705	1,070	2,290	1,070	218	62	60
30	73	56	79	332	......	545	1,320	2,690	1,070	190	60	51
31	73	......	83	242	......	490	......	3,280	......	184	63	......

NOTE.—Discharge determined from a rating curve well defined between 300 and 3,000 second-feet. Discharge Oct. 26, interpolated.

Monthly discharge of Kaweah River near Three Rivers, Cal., for the year ending Sept. 30, 1915.

[Drainage area, 520 square miles.]

Month.	Discharge in second-feet.				Run-off.		Accuracy.
	Maximum.	Minimum.	Mean.	Per square mile.	Depth in inches on drainage area.	Total in acre-feet.	
October	105	56	69.9	0.135	0.16	4,300	B.
November	79	48	58.2	.112	.12	3,460	B.
December	101	56	80.5	.155	.18	4,950	B.
January	332	83	135	.260	.30	8,300	B.
February	705	222	345	.663	.69	19,200	A.
March	815	232	439	.844	.97	27,000	A.
April	1,360	545	888	1.71	1.91	52,800	A.
May	3,280	938	1,690	3.25	3.75	104,000	A.
June	3,280	1,070	1,770	3.40	3.79	105,000	A.
July	980	184	500	.962	1.11	30,700	A.
August	175	60	104	.200	.23	6,400	B.
September	73	45	57.2	.110	.12	3,400	B.
The year	3,280	45	511	.983	13.33	370,000	

NORTH FORK OF KAWEAH RIVER AT KAWEAH, CAL.

Location.—In the SW. ¼ sec. 2, T. 17 S., R. 28 E., at highway bridge in Sequoia National Forest, about one-half mile north of Kaweah, Tulare County, and 2 miles above junction with Kaweah River. Manikin Creek enters one-fourth mile below and Sheep Creek 2½ miles above gage.

Drainage area.—Not measured.

Records available.—October 12, 1910, to September 30, 1915.

Gage.—Staff gage in two sections on right bank; low-water section is inclined and fastened to abutment of bridge; upper section is vertical and fastened to sycamore tree 20 feet below bridge. Previous to January, 1914, flood gage was vertical staff fastened to right abutment. Gage read once a day by J. T. Weckert.

Discharge measurements.—Made from bridge at gage or by wading.

Channel and control.—Solid rock and sand; fairly permanent. One channel at all stages.

Extremes of discharge.—Maximum stage recorded during year, 3.4 feet during night of April 30 (discharge, 940 second-feet); minimum stage recorded, 0.54 foot September 27–29 (discharge, 0.9 second-foot).

1910–1915: Maximum stage recorded, 10.2 feet at 7 p. m. January 25, 1914 (discharge, about 7,400 second-feet, determined from extension of rating curve); minimum stage recorded, 0.35 foot August 27, 1913 (discharge, 0.8 second-foot).

Diversions.—About 20 second-feet is diverted by several small ditches for irrigation above the station.

Regulation.—None.

Accuracy.—Rating curves are fairly well defined except at extremely low stages. Results good, except for low stages.

Discharge measurements of North Fork of Kaweah River at Kaweah, Cal., during the year ending Sept. 30, 1915.

Date.	Made by—	Gage height.	Discharge.	Date.	Made by—	Gage height.	Discharge.
		Feet.	*Sec.-ft.*			*Feet.*	*Sec.-ft.*
Oct. 20	R. C. Rice	0.67	6.2	June 10	H. J. Tompkins	2.11	205
21	do	.68	4.7				

Daily discharge, in second-feet, of North Fork of Kaweah River at Kaweah, Cal., for the year ending Sept. 30, 1915.

Day.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.
1	5.1	5.7	6.0	16	61	90	144	282	376	66	15	3.0
2	3.6	5.7	7.5	17	165	80	200	282	376	62	14	3.0
3	3.6	5.7	8.5	17	87	76	235	260	326	58	14	2.7
4	3.6	6.0	18	31	74	74	275	376	290	57	13	2.7
5	3.9	5.7	18	28	63	74	218	454	241	56	12	2.4
6	3.9	5.4	14	26	61	74	193	350	260	54	12	2.4
7	4.5	5.4	10	22	58	77	200	350	241	52	12	2.4
8	4.8	5.1	9.5	25	59	70	200	428	206	51	12	2.4
9	4.8	5.1	5.4	23	295	73	200	350	482	49	12	2.1
10	5.1	5.1	13	21	218	69	255	350	206	47	12	2.1
11	5.1	5.1	14	21	176	69	275	376	189	44	11	2.1
12	5.1	5.1	15	21	95	69	315	376	189	43	10	1.5
13	4.8	5.1	17	23	80	70	385	568	161	41	10	1.5
14	4.5	5.1	16	24	74	71	275	428	149	39	10	1.8
15	4.5	5.1	17	49	71	97	218	401	144	37	9.5	2.1
16	4.8	4.8	17	37	71	141	255	401	139	36	9.5	2.1
17	4.8	4.8	20	28	186	162	295	692	126	33	9.0	1.8
18	4.8	4.8	20	23	130	159	338	568	120	32	9.0	1.5
19	5.1	4.8	19	22	110	165	360	454	114	31	8.5	1.4
20	5.4	4.8	18	22	133	200	338	401	107	30	7.3	1.3
21	5.7	4.8	19	22	112	196	338	350	103	26	6.1	1.3
22	7.0	4.8	19	22	106	218	275	326	98	24	4.5	1.2
23	7.5	4.8	19	21	97	235	295	326	93	22	4.5	1.2
24	8.0	4.8	19	22	90	295	218	350	88	21	4.5	1.1
25	7.0	4.8	19	31	90	275	255	326	85	20	3.9	1.0
26	6.0	4.8	18	29	87	200	235	326	84	19	3.9	1.0
27	6.0	4.8	18	27	80	144	200	350	78	18	3.6	.9
28	5.4	4.8	17	71	83	147	218	376	72	17	3.3	.9
29	5.4	4.8	15	99	....	275	295	376	69	18	3.3	.9
30	5.7	5.1	16	97	....	162	435	401	68	19	3.3	1.3
31	5.7	....	17	62	....	153	....	401	....	16	3.0	....

NOTE.—Discharge determined from two rating curves as follows: Oct. 1 to Apr. 30, fairly well defined above 25 second-feet; May 1 to Sept. 30, fairly well defined above 20 second-feet.

Monthly discharge of North Fork of Kaweah River at Kaweah, Cal., for the year ending Sept. 30, 1915.

Month.	Discharge in second-feet.			Run-off (total in acre-feet).	Accuracy.
	Maximum.	Minimum.	Mean.		
October	8.0	3.6	5.20	320	D.
November	6.0	4.8	5.09	303	D.
December	20	5.4	15.4	947	C.
January	99	16	32.2	1,980	C.
February	295	58	108	6,000	B.
March	295	69	137	8,420	B.
April	435	144	265	15,800	B.
May	692	260	389	23,900	B.
June	482	68	175	10,400	B.
July	66	16	36.7	2,260	B.
August	15	3.0	8.57	527	C.
September	3.0	.9	1.77	105	D.
The year	692	.9	98.0	71,000	

SOUTH FORK OF KAWEAH RIVER NEAR THREE RIVERS, CAL.

LOCATION.—In the SE. ¼ sec. 8, T. 18 S., R. 29 E., on Mehrten ranch, 500 feet above mouth of Cinnamon Creek, 4½ miles southeast of Three Rivers, Tulare County, and about 5 miles above junction with Kaweah River.

DRAINAGE AREA.—Not measured.

RECORDS AVAILABLE.—September 18, 1911, to September 30, 1915.

Gage.—Vertical staff fastened to large boulder on right bank, read once a day by D. N. Mehrten.

Discharge measurements.—Made from car and cable 300 feet above gage or by wading.

Channel and control.—Gravel and boulders; rough and fairly permanent. Both banks are subject to overflow at extremely high water.

Extremes of discharge.—Maximum stage recorded during year, 4.6 feet at 5.45 a. m., June 1 (discharge, 600 second-feet); minimum stage recorded, 1.96 feet at 6.30 a. m., October 17 (discharge, 5.4 second-feet).

1911–1915: Maximum stage recorded, 5.8 feet at 8.15 a. m., January 25, 1914 (discharge, 1,460 second-feet); minimum stage recorded, 1.82 feet at 7.15 a. m., October 1, 1912 (discharge, 3.3 second-feet).

Diversions.—Two small ditches divert water for irrigation above the station.

Regulation.—None.

Accuracy.—Results good.

Discharge measurements of South Fork of Kaweah River near Three Rivers, Cal., during the year ending Sept. 30, 1915.

Date.	Made by—	Gage height.	Discharge.
		Feet.	*Sec.-ft.*
Oct. 20	R. C. Rice	2.00	5.8
June 9	H. J. Thompkins	4.33	471

Daily discharge, in second-feet, of South Fork of Kaweah River near Three Rivers, Cal., for the year ending Sept. 30, 1915.

Day.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.
1	12	6	7	9	24	43	59	140	600	112	18	10
2	10	6	7	9	123	32	62	148	495	103	17	10
3	10	6	7	9	36	31	65	140	520	92	16	10
4	9	6	7	19	24	31	62	123	445	82	15	10
5	8.5	6	7	18	21	30	62	241	355	78	14	10
6	8	6	7	18	19	29	63	192	470	72	13	10
7	7.5	6	7	17	15	28	64	192	495	176	13	10
8	7	6	7	16	15	26	64	207	545	52	12	10
9	6.5	6	7	15	119	26	65	176	545	49	12	10
10	6.5	6	7.5	15	101	26	66	176	470	47	11	10
11	6	6	8.5	14	112	26	74	224	445	45	10	10
12	6	6	9	14	39	25	101	207	445	41	10	10
13	6	6	9	14	36	24	65	335	445	36	10	10
14	6	6	9	24	29	24	66	277	315	33	10	10
15	5.5	6	9	14	26	26	67	315	335	32	10	10
16	5.5	6	9	13	39	28	72	335	335	31	9.5	10
17	5.5	6	9.5	13	67	30	73	355	315	29	9	10
18	5.5	6	9.5	13	62	32	74	400	296	29	8	10
19	6	6	9.5	13	56	38	79	335	296	28	8	10
20	6	6.5	9.5	12	67	43	82	277	241	27	7.5	9.5
21	7	6.5	9.5	12	39	56	92	259	241	26	39	9.5
22	6	6.5	9	11	39	56	148	252	231	25	26	9
23	6	6.5	9	11	39	56	143	241	224	24	21	9
24	6	6.5	9	10	39	56	136	248	198	22	18	9
25	6	6.5	9	11	39	59	123	266	176	21	17	9
26	6	6.5	9	11	39	58	123	288	168	20	15	8.5
27	6	6.5	9	11	39	57	121	335	156	20	13	8
28	6	6.5	9	24	39	54	119	422	148	19	12	8
29	6	6.5	9	39	....	54	116	445	136	19	11	8
30	6	6.5	9	43	....	55	168	470	123	18	10	7.5
31	6	....	9	29	....	56	....	545	....	18	10	....

Note.—Discharge determined from a fairly well defined rating curve.

Monthly discharge of South Fork of Kaweah River near Three Rivers, Cal., for the year ending Sept. 30, 1915.

Month.	Discharge in second-feet.			Run-off (total in acre-feet).	Accuracy.
	Maximum.	Minimum.	Mean.		
October	12	5.5	6.77	416	B.
November	6.5	6	6.18	368	B.
December	9.5	7	8.44	519	B.
January	43	9	16.2	996	B.
February	123	15	47.9	2,660	B.
March	59	24	39.2	2,410	B.
April	168	59	89.1	5,300	B.
May	545	123	276	17,000	B.
June	600	123	340	20,200	B.
July	176	18	46.0	2,830	B.
August	39	7.5	13.7	842	B.
September	10	7.5	9.50	565	B.
The year	600	5.5	74.8	54,100	

KINGS RIVER NEAR SANGER, CAL.

Location.—In the NW. ¼ sec. 8, T. 13 S., R. 24 E., about half a mile below new highway bridge at Piedra, near mouth of canyon, southwest of Red Mountain, and about 12 miles northeast of Sanger, Fresno County.

Drainage area.—1,740 square miles.

Records available.—September 3, 1895, to September 30, 1915.

Gage.—United States Weather Bureau inclined staff on left bank read once a day by A. V. Waugh. The flood of January, 1914, washed out the Friez water-stage recorder which was situated on the opposite bank at the same datum. The record from the present gage began January 30, 1914.

Discharge measurements.—Made from car and cable 500 feet below gage.

Channel and control.—Gravel and small boulders; shifts slightly during high water. One channel at all stages.

Extremes of discharge.—Maximum stage recorded during year, 13.3 feet at 7 a. m. June 1 (discharge, 18,300 second-feet); minimum stage recorded, 3.3 feet at 7 a. m. December 3 (discharge, 180 second-feet).

1895–1915: Maximum stage recorded, 21.8 feet during night of January 25, 1914, determined by leveling from flood marks (discharge computed from extension of rating curve, 59,700 second-feet); minimum stage recorded, 3.7 feet January 21, 1904 (discharge, 130 second-feet).

Diversions.—Several miles above the station there is a small diversion for a flume used to float lumber to Sanger.

Regulation.—None.

Accuracy.—Results excellent.

Discharge measurements of Kings River near Sanger, Cal., during the year ending Sept. 30, 1915.

Date.	Made by—	Gage height.	Discharge.	Date.	Made by—	Gage height.	Discharge.
		Feet.	*Sec.-ft.*			*Feet.*	*Sec.-ft.*
Oct. 24	R. C. Rice	3.93	361	June 8	H. J. Tompkins	12.10	13,000
Mar. 29	Charles Leidl	7.14	2,800	Sept. 5	H. D. McGlashan	4.42	539
29	.....do	7.03	2,640				

Daily discharge, in second-feet, of Kings River near Sanger, Cal., for the year ending Sept. 30, 1915.

Day.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.
1	885	665	200	250	830	1,280	2,240	3,960	16,300	7,210	1,130	505
2	885	615	200	250	1,420	1,280	2,440	3,270	14,900	7,210	1,130	490
3	885	520	190	250	1,760	1,200	2,660	3,270	12,100	6,990	1,130	580
4	885	475	238	332	1,000	1,200	3,010	3,530	10,000	7,210	1,060	555
5	830	390	280	452	748	885	2,660	4,430	9,700	6,330	995	580
6	720	390	350	280	665	885	2,240	3,530	12,100	6,330	995	608
7	665	390	250	280	615	830	2,140	3,670	13,200	5,910	930	555
8	665	350	225	298	615	830	2,240	4,110	13,500	3,530	835	530
9	565	350	200	350	6,990	830	2,440	3,670	15,500	4,430	805	458
10	520	350	200	280	3,140	830	2,890	3,670	14,900	4,430	865	505
11	390	350	238	280	2,770	830	3,400	4,600	12,500	4,430	865	458
12	390	350	250	280	1,580	830	4,270	5,130	10,300	4,770	775	435
13	390	350	225	280	1,200	830	4,110	7,210	8,650	4,950	745	370
14	390	350	200	370	1,070	830	3,400	5,710	9,150	3,530	718	350
15	390	350	200	370	830	830	2,890	5,910	9,700	3,010	745	350
16	390	350	200	315	945	1,070	3,400	7,650	10,900	2,770	662	370
17	390	350	315	280	1,580	1,580	3,960	9,700	10,300	2,550	690	350
18	565	332	280	280	2,040	1,760	4,950	7,650	10,900	2,550	662	390
19	615	332	280	280	1,500	1,850	6,330	5,910	9,400	2,440	718	332
20	565	332	280	280	1,500	2,140	6,990	5,130	9,150	2,340	745	280
21	565	332	280	280	1,850	2,440	6,330	4,770	9,150	2,340	662	265
22	520	280	250	280	1,500	2,550	4,600	5,320	9,700	2,770	635	250
23	390	280	250	315	1,280	2,770	4,600	6,330	9,150	3,010	555	250
24	390	250	280	280	1,280	3,010	3,960	6,550	8,900	3,270	580	225
25	350	238	280	390	1,280	3,010	4,110	6,770	8,650	2,550	555	238
26	350	225	280	315	1,140	3,140	3,960	7,210	7,650	2,340	505	225
27	350	212	280	315	1,140	1,940	3,400	9,150	7,210	2,140	530	288
28	350	200	280	565	1,140	1,940	4,110	11,500	6,770	1,760	505	250
29	350	200	280	945	....	3,010	4,110	10,600	7,900	1,500	480	250
30	475	200	250	1,500	....	1,940	4,430	11,800	7,210	1,580	505	250
31	475	....	250	885	....	1,760	....	14,200	....	1,280	435	....

NOTE.—Discharge determined from two rating curves as follows: Oct. 1 to June 1, well defined above 250 second-feet; June 2 to Sept. 30, well defined above 200 second-feet.

Monthly discharge of Kings River near Sanger, Cal., for the year ending Sept. 30, 1915.

[Drainage area, 1,740 square miles.]

Month.	Discharge in second-feet.				Run-off.		Accuracy.
	Maximum.	Minimum.	Mean.	Per square mile.	Depth in inches on drainage area.	Total in acre-feet.	
October	885	350	534	0.307	0.35	32,800	A.
November	665	200	345	.198	.22	20,500	A.
December	350	190	250	.144	.17	15,400	A.
January	1,500	250	391	.225	.26	24,000	A.
February	6,990	615	1,550	.891	.93	86,100	A.
March	3,140	830	1,620	.931	1.07	99,600	A.
April	6,990	2,140	3,740	2.15	2.40	223,000	A.
May	14,200	3,270	6,320	3.63	4.18	389,000	A.
June	16,300	6,770	10,500	6.03	6.73	625,000	A.
July	7,210	1,280	3,790	2.18	2.51	233,000	A.
August	1,130	435	747	.429	.49	45,900	A.
September	608	225	383	.220	.25	22,800	A.
The year	16,300	190	2,510	1.44	19.56	1,820,000	

DINKEY CREEK NEAR OCKENDEN, CAL.

Location.—In the NE. ¼ sec. 20, T. 10 S., R. 26 E., above trail bridge at Dinkey Creek ranger station, in Sierra National Forest, about 9½ miles southeast of Ockenden, Fresno County, and about 11 miles above junction with North Fork of Kings River. Bear Creek enters 1½ miles below and Rock Creek 3 miles above the station.

Drainage area.—Not measured.

Records available.—September 17, 1910, to September 29, 1915 (fragmentary), when the station was discontinued.

Gage.—Vertical staff on right bank about 400 feet below ranger station, read once or twice a day by Roy Boothe.

Discharge measurements.—Made from car and cable or by wading.

Channel and control.—Gravel and small boulders; fairly permanent.

Extremes of stage.—Maximum stage recorded during year, 3.9 feet, at 5.30 p. m., May 31; minimum stage recorded, 0.3 foot at 8 a. m. September 29.

1911–1915: Maximum stage recorded, 3.9 feet at 5.30 p. m. May 31, 1915; minimum stage recorded, 0.3 foot August and September, 1912, September, 1913 and 1915.

Diversions.—No information.

Regulation.—No information.

Cooperation.—Gage-height record furnished by United States Forest Service.

Estimates of discharge not prepared since the year ending September 30, 1913, as no discharge measurements were secured.

Daily gage height, in feet, of Dinkey Creek near Ockenden, Cal., for the year ending Sept. 30, 1915.

Day.	Apr.	May.	June.	July.	Aug.	Sept.	Day.	Apr.	May.	June.	July.	Aug.	Sept.
1			3.45				16	2.4		2.7			
2			3.0				17	2.2		2.8			
3							18				1.2		
4							19					.5	
5							20						
6							21						
7							22						
8					0.7	0.4	23			2.0		.5	
9							24						
10							25			2.0			
11							26						
12							27		3.15				
13			2.4				28		3.15		.9		
14			2.6		.6		29		3.5				.3
15			2.0				30		3.3				
							31		3.5				

SAN JOAQUIN RIVER BASIN.

SAN JOAQUIN RIVER NEAR SHAVER, CAL.

Location.—In the N. ½ sec. 27, T. 8 S., R. 24 E., between Madera and Fresno counties, about 500 feet above junction with Big Creek, and 5 miles northwest of Shaver.

Drainage area.—1,060 [1] square miles (measured on topographic maps).

Records available.—August 11, 1912, to September 30, 1915.

Gage.—Storrow seven-day water-stage recorder on left bank.

Discharge measurements.—Made from car and cable near gage.

Channel and control.—Rough broken rock; not likely to change.

Extremes of discharge.—1912–1915: Maximum daily discharge, 15,300 second-feet, May 31, 1915; minimum mean daily discharge, 91 second-feet, January 8, 1913.

Winter flow.—Stage-discharge relation not affected by ice.

Diversions.—No information.

Regulation.—No information.

Accuracy.—Rating curve well defined; results good.

Cooperation.—Daily discharge record furnished by the Pacific Light & Power Corporation, through R. C. Starr, hydraulic engineer.

Daily discharge, in second-feet, of San Joaquin River near Shaver, Cal., for the year ending Sept. 30, 1915.

Day.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.
1	735	439	218	282	719	787	2,140	2,840	12,700	7,460	1,500	658
2	645	481	227	283	981	711	2,550	2,820	12,400	7,330	1,500	766
3	592	450	264	291	701	684	2,830	2,800	11,700	7,000	1,500	776
4	542	424	308	329	588	683	2,940	2,900	11,900	6,930	1,460	747
5	501	388	284	309	603	732	2,490	3,120	11,600	6,890	1,390	676
6	482	371	276	314	666	740	2,060	3,440	11,000	5,730	1,380	638
7	473	348	259	307	670	732	2,080	3,660	10,400	5,880	1,360	603
8	449	333	264	314	1,120	704	1,990	3,940	9,680	6,250	1,280	538
9	428	314	239	305	1,230	690	2,200	4,280	9,120	6,720	1,160	497
10	418	305	288	274	944	668	2,680	4,660	8,710	7,040	1,120	470
11	392	295	291	287	883	666	3,120	4,970	7,960	6,420	1,060	453
12	372	274	280	291	844	701	3,800	5,170	8,360	6,460	1,010	428
13	356	272	261	291	745	732	4,160	6,360	8,690	6,020	960	403
14	346	263	218	427	844	866	3,000	6,150	9,000	5,930	940	403
15	337	259	251	361	846	1,120	2,800	5,970	9,500	5,580	940	400
16	329	251	295	287	1,230	1,350	2,970	5,690	9,750	5,030	926	393
17	329	247	309	311	1,790	1,490	4,130	5,450	9,380	4,400	897	385
18	346	239	311	340	1,200	1,560	4,950	5,180	8,480	3,720	880	381
19	370	222	305	329	1,040	1,610	5,950	4,840	7,760	3,500	838	375
20	374	206	309	329	1,040	1,720	6,280	4,320	7,470	3,130	761	356
21	419	206	307	311	874	1,910	5,750	4,160	8,160	3,220	724	354
22	445	209	311	309	810	2,070	5,080	4,490	9,090	3,590	726	354
23	419	214	309	299	773	2,360	4,560	5,110	9,040	3,480	719	354
24	409	214	307	294	751	2,620	4,170	5,110	8,920	3,230	704	352
25	387	214	295	333	739	2,890	3,870	4,850	8,560	3,060	690	352
26	369	214	291	337	748	2,660	3,490	5,600	7,090	2,840	668	350
27	358	214	289	419	748	2,180	3,090	8,410	7,540	2,520	655	348
28	355	204	280	741	801	2,750	3,040	10,100	8,210	2,190	668	344
29	350	206	276	940	....	2,740	3,080	11,800	8,120	1,880	686	333
30	397	222	274	688	....	2,210	3,070	13,700	7,590	1,710	680	329
31	478	....	280	578	....	1,980	....	15,300	....	1,590	676	....

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[1] Area published in previous water-supply papers is in error.

Monthly discharge of San Joaquin River near Shaver, Cal., for the years ending Sept. 30, 1912–1915.

[Drainage area, 1,060[a] square miles.]

Month.	Discharge in second-feet.				Run-off.	
	Maximum.	Minimum.	Mean.	Per square mile.	Depth in inches on drainage area.	Total in acre-feet.
1912.						
August 11–31	645	347	503	0.475	0.37	21,000
September	394	200	275	.259	.29	16,400
1912–13.						
October	285	162	211	.199	.23	13,000
November	332	183	225	.212	.24	13,400
December	193	106	152	.143	.16	9,350
January	321	91	195	.184	.21	12,000
February	381	231	289	.273	.28	16,000
March	1,400	263	493	.465	.54	30,300
April	4,270	1,010	1,890	1.78	1.99	112,000
May	7,120	1,790	4,540	4.28	4.93	279,000
June	5,030	2,490	3,680	3.47	3.87	219,000
July	2,680	1,090	1,980	1.87	2.16	122,000
August	3,560	535	1,400	1.32	1.52	86,100
September	2,680	288	700	.660	.74	41,700
The year	7,120	91	1,320	1.25	16.87	954,000
1913–14.						
October	280	180	215	0.203	0.23	13,200
November	430	202	318	.300	.33	18,900
December	1,750	238	389	.367	.42	23,900
January	9,900	645	2,110	1.99	2.29	130,000
February	5,000	1,250	1,840	1.74	1.81	102,000
March	3,270	1,820	2,490	2.35	2.71	153,000
April	5,570	2,000	3,850	3.63	4.05	229,000
May	7,210	2,680	5,100	4.81	5.54	314,000
June	7,930	3,810	5,480	5.17	5.77	326,000
July	5,570	2,310	3,730	3.52	4.06	229,000
August	2,480	810	1,690	1.59	1.83	104,000
September	1,800	445	698	.658	.73	41,500
The year	9,900	180	2,330	2.20	29.77	1,680,000
1914–15.						
October	735	329	426	.402	.46	26,200
November	481	204	283	.267	.30	16,800
December	311	218	280	.264	.30	17,200
January	940	274	371	.350	.40	22,800
February	1,790	588	890	.840	.87	49,400
March	2,890	666	1,460	1.38	1.59	89,800
April	6,280	1,990	3,480	3.28	3.66	207,000
May	15,300	2,800	5,720	5.40	6.23	352,000
June	12,700	7,090	9,260	8.74	9.75	551,000
July	7,460	1,590	4,730	4.46	5.14	291,000
August	1,500	655	983	.927	1.07	60,400
September	776	329	461	.435	.49	27,400
The year	15,300	204	2,360	2.23	30.26	1,710,000

[a] Supersedes figures published in previous reports.

NOTE.—Discharge in second-feet per square mile, and run-off (depth, in inches on drainage area), October 1913, to September, 1914, differ from that published in Water-Supply Paper 391, p. 140, because an erroneous figure was used for drainage area in that report.

SAN JOAQUIN RIVER NEAR FRIANT, CAL.

LOCATION.—In the NW. ¼ sec. 5, T. 11 S., R. 21 E., about 1½ miles northeast of Friant, Fresno County.

DRAINAGE AREA.—1,640 square miles at old location 2 miles upstream.

RECORDS AVAILABLE.—October 18, 1907, to September 30, 1915.

GAGE.—Gurley weight-driven printing water-stage recorder on left bank (Pl. IV, *B*,) installed December 9, 1913. Previous to that date the gage was a staff located on left bank in the SE. ¼ sec. 34, T. 10 S., R. 21 E., about 4 miles northeast of Friant (30 feet upstream from cable). Relation between old datum and new datum unknown.

Discharge measurements.—Made from cable 2 miles upstream at site of original gage or by wading.

Channel and control.—Channel is composed of sand and gravel. Control is a solid rock dike about 500 feet below gage.

Extremes of discharge.—Maximum stage during year from water-stage recorder, 13.05 feet from 8.30 to 9 a. m. June 1 (discharge, 15,900 second-feet); minimum stage from water-stage recorder, 3.61 feet from 6.30 to 6.45 a. m. December 2 (discharge, 313 second-feet).

1907–1915: Maximum stage recorded, 21.72 feet at 11.30 p. m. January 25, 1914 (discharge, 46,200 second-feet); minimum stage recorded, 3.25 feet October 17 to 19 and 22 to 29, 1913 (discharge, 170 second-feet).

Diversions.—Fresno Flume & Lumber Co. diverts about 10 second-feet from Stevenson Creek. This water is used for irrigation near Clovis.

Regulation.—Storage is developed for power at Huntington Lake on Big Creek and at Crane Valley reservoir on North Fork Creek.

Accuracy.—Results excellent except for short periods when water-stage recorder was not running.

Discharge measurements of San Joaquin River near Friant, Cal., during the year ending Sept. 30, 1915.

Date.	Made by—	Gage height.	Discharge.	Date.	Made by—	Gage height.	Discharge.
		Feet.	*Sec.-ft.*			*Feet.*	*Sec.-ft.*
Oct. 15	R. C. Rice	4.39	593	Sept. 29	Charles Leidl	4.45	636
Mar. 30	Charles Leidl	7.55	2,830				

Daily discharge, in second-feet, of San Joaquin River near Friant, Cal., for the year ending Sept. 30, 1915.

Day.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.
1	1,060	720	400	478	1,040	1,690	2,540	4,340	13,500	7,690	1,650	906
2	972	636	388	449	1,620	1,500	3,050	4,430	12,600	7,690	1,580	913
3	872	715	435	470	2,000	1,330	3,530	4,000	10,700	7,920	1,550	920
4	790	680	470	452	1,240	1,240	3,460	3,680	8,900	7,690	1,520	927
5	767	631	522	530	1,010	1,240	2,990	5,080	8,400	7,230	1,490	894
6	744	595	482	506	1,010	1,250	2,540	4,610	9,910	5,580	1,460	822
7	722	590	435	498	1,020	1,200	2,440	4,610	11,500	4,610	1,470	813
8	700	550	456	506	1,030	1,170	2,400	4,800	12,600	4,520	1,390	804
9	678	478	456	510	3,460	1,150	2,540	4,260	13,800	5,380	1,330	795
10	656	534	449	494	2,870	1,150	3,310	4,700	13,200	5,800	1,320	786
11	634	510	486	435	2,400	1,090	3,760	5,280	12,300	6,330	1,290	777
12	612	510	490	494	1,760	1,130	4,800	4,980	10,200	6,330	1,230	768
13	590	498	498	494	1,460	1,140	4,890	7,000	8,650	5,900	1,170	759
14	568	486	428	538	1,340	1,190	3,760	6,550	8,650	5,580	1,140	750
15	546	486	421	740	1,280	1,430	3,530	6,000	8,650	4,520	1,100	741
16	542	400	452	577	1,340	1,800	3,380	7,000	10,200	4,000	1,110	732
17	534	470	564	502	2,820	2,000	4,000	8,900	9,910	3,920	1,090	723
18	534	466	577	486	2,350	2,130	5,180	8,160	9,650	3,600	1,040	714
19	518	456	522	550	1,760	2,220	6,000	6,220	9,400	3,310	990	705
20	595	424	546	522	1,760	2,350	6,440	5,280	8,650	3,240	949	696
21	595	410	470	554	1,730	2,440	6,220	4,700	8,650	3,240	922	687
22	660	650	510	518	1,400	2,700	5,480	4,890	8,900	3,600	883	679
23	680	514	526	506	1,350	2,990	4,980	5,800	9,400	4,170	894	671
24	650	466	522	494	1,280	3,380	4,520	5,900	9,400	4,430	984	663
25	622	418	534	478	1,310	3,600	4,610	5,800	8,650	3,600	905	655
26	586	421	486	546	1,250	3,380	3,840	5,690	7,690	3,310	883	647
27	577	394	494	546	1,150	2,820	4,430	8,160	7,120	2,870	834	639
28	572	421	470	927	1,340	2,650	4,890	10,200	7,920	2,440	795	631
29	554	428	482	1,650	....	4,000	5,180	9,650	8,160	2,130	762	572
30	550	400	478	1,730	....	2,930	5,180	9,910	7,920	1,920	790	559
31	622	....	474	1,090	....	2,400	....	11,200	....	1,760	900	....

Note.—Discharge determined from a rating curve well defined below 20,000 second-feet. Discharge, Oct. 5-14, Aug. 3-5, Sept. 1-3 and 7-27, when water-stage recorder was not running, estimated by interpolation.

Monthly discharge of San Joaquin River near Friant, Cal., for the year ending Sept. 30, 1915.

Month.	Discharge in second-feet.			Run-off (total in acre-feet).	Accuracy.
	Maximum.	Minimum.	Mean.		
October	1,060	518	655	40,300	B.
November	720	394	512	30,500	A.
December	577	388	481	29,600	A.
January	1,730	435	622	38,200	A.
February	3,460	1,010	1,620	90,000	A.
March	4,000	1,090	2,020	124,000	A.
April	6,440	2,400	4,130	246,000	A.
May	11,200	3,680	6,190	381,000	A.
June	13,800	7,120	9,840	586,000	A.
July	7,920	1,760	4,660	287,000	A.
August	1,650	762	1,140	70,100	A.
September	927	559	745	44,300	
The year	13,800	388	2,710	1,970,000	

SAN JOAQUIN RIVER NEAR NEWMAN, CAL.

Location.—In the SW. ¼ sec. 3, T. 7 S., R. 9 E., at drawbridge on Hill's ferry road, 300 feet below mouth of Merced River, and 3½ miles northeast of Newman, Stanislaus County.

Drainage area.—Not measured.

Records available.—April 29, 1912, to September 30, 1915.

Gage.—Vertical staff fastened to upstream side of downstream support of draw span, located 60 feet below the bridge in the middle of the stream; read once a day by Rasmus Lorensen.

Discharge measurements.—Made from bridge or by wading.

Channel and control.—Composed of sand and small gravel which shifts during high water. Both banks are subject to overflow.

Extremes of discharge.—Maximum stage recorded during year, 15.6 feet at 7 a. m. June 12, 20, and 21 (discharge, 15,200 second-feet); minimum stage recorded, 2.0 feet at 7 a. m. September 28 (discharge, 145 second-feet).

1912–1915: Maximum stage recorded, 18.0 feet at 9 a. m., January 27, 1914 (discharge, 20,700 second-feet); minimum stage recorded, 1.0 foot October 5 and 8 to 18, 1913 (discharge, 50 second-feet).

Diversions.—Practically the entire low-water flow of main river and tributaries is diverted for irrigation purposes, hence the low-water records show the amount of return water.

Regulation.—Storage is developed for power at Huntington Lake on Big Creek and at Crane Valley reservoir on North Fork Creek.

Accuracy.—Changes in rating curve are fairly well defined by discharge measurements; results good.

Discharge measurements of San Joaquin River near Newman, Cal., during the year ending Sept. 30, 1915.

Date.	Made by—	Gage height.	Discharge.	Date.	Made by—	Gage height.	Discharge.
		Feet.	*Sec.-ft.*			*Feet.*	*Sec.-ft.*
Oct. 14	R. C. Rice	2.12	219	Aug. 28	Charles Leidl	2.65	272
Feb. 1	Charles Leidl	7.70	3,830	Sept. 25	do	2.14	173
Apr. 1	do	8.01	4,090				

Daily discharge in second-feet of San Joaquin River near Newman Cal., for the year ending Sept. 30, 1915.

Day.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.
1	215	275	295	540	3,540	5,890	4,080	5,460	11,900	12,100	1,390	248
2	450	275	295	510	5,160	6,000	4,260	5,260	12,400	11,700	1,270	235
3	420	285	345	490	6,330	5,780	4,260	5,160	12,800	11,200	1,090	225
4	370	295	320	480	7,580	5,560	4,170	5,160	12,800	11,000	980	215
5	320	320	320	480	6,330	5,260	4,080	5,160	12,200	10,700	880	215
6	285	345	420	540	5,890	5,060	3,900	5,560	12,100	10,300	780	235
7	275	370	570	610	5,670	4,660	3,720	5,560	12,800	10,000	690	235
8	265	370	610	610	4,860	4,260	3,720	5,670	13,600	9,210	600	225
9	255	345	610	610	4,260	3,990	3,810	5,780	14,400	8,750	600	225
10	235	370	540	690	9,050	3,810	3,540	6,000	15,000	8,300	540	235
11	225	345	510	880	9,370	3,630	3,280	6.110	15,000	7,860	520	225
12	215	345	395	780	10,300	3,450	3,360	6,330	15,200	7,040	480	215
13	215	345	420	690	9,530	3,120	3,720	7,040	14,400	6,130	445	205
14	215	345	420	610	9,370	2,880	3,900	9,210	14,400	5,370	410	205
15	215	320	395	610	9,210	2,880	4,080	8,900	14,200	5,010	410	215
16	215	320	370	1,090	8,150	2,800	4,080	8,300	14,400	4,770	392	215
17	215	295	370	880	7,170	2,800	4,460	8,750	14,800	4,550	345	215
18	215	295	395	780	6,790	2,720	4,660	9,850	15,000	4,550	345	195
19	225	320	420	690	6,910	2,720	5,160	11,000	15,000	4,330	345	185
20	235	345	480	690	6,110	2,480	5,460	10,500	15,200	3,800	345	175
21	255	370	480	610	7,170	2,880	5,890	10,000	15,200	3,500	315	168
22	275	370	540	610	7,440	3,120	6,000	9,530	15,000	3,140	300	160
23	275	320	540	540	7,170	3,280	6,110	9,370	15,000	2,870	285	160
24	275	320	540	540	7,440	3,540	6,110	9,850	14,800	2,620	285	160
25	275	295	510	540	7,170	3,720	6,110	10,000	14,400	2,300	272	160
26	275	295	480	510	6,550	3,900	6,220	10,000	14,200	2,000	260	168
27	295	295	480	540	5,890	3,630	6,220	9,690	13,600	1,930	260	160
28	275	320	480	650	5,460	3,540	5,890	10,300	13,000	2,000	260	145
29	275	320	510	1,210	....	3,630	5,560	11,300	12,400	2,000	260	160
30	275	295	480	3,200	....	4,660	5,460	11,700	12,400	1,860	272	168
31	275	....	540	3,450	....	4,360	....	11,700	....	1,650	260	....

NOTE.—Discharge determined from three rating curves, as follows: Oct. 1 to Jan. 29, fairly well defined; Jan. 30 to June 20, well defined; and June 21 to Sept. 30, fairly well defined.

Monthly discharge of San Joaquin River, near Newman, Cal., for the year ending Sept, 30, 1915.

Month.	Discharge in second-feet.			Run-off (total in acre-feet).	Accuracy.
	Maximum.	Minimum.	Mean.		
October	450	215	268	16,500	B.
November	370	275	324	19,300	B.
December	610	295	454	27,900	B.
January	3,450	480	827	50,800	B.
February	10,300	3,540	7,000	389,000	A.
March	6,000	2,480	3,870	238,000	A.
April	6,220	3,280	4,710	280,000	A.
May	11,700	5,160	8,200	504,000	A.
June	15,200	11,900	13,900	827,000	A.
July	12,100	1,650	5,890	362,000	B.
August	1,390	260	512	31,500	B.
September	248	145	198	11,800	B.
The year	15,200	145	3,810	2,760,000	

BIG CREEK NEAR BIG CREEK,[1] CAL.

LOCATION.—In the SW. ¼ NW. ¼ sec. 14,[2] T. 8 S., R. 25 E., at Huntington Lake, 2½ miles northeast of Big Creek, Fresno County.

DRAINAGE AREA.—79[3] square miles (measured by Pacific Light & Power Corporation).

RECORDS AVAILABLE.—January 1, 1910, to September 30, 1915.

GAGE.—Hook gage at Huntington Lake.

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[1] Formerly called "Big Creek near Shaver."

[2] Section location previously published is in error

[3] Revised; measured on topographic map.

Discharge.—Flow into lake computed from reservoir records.

Accuracy.—Mean discharge for month is accurate, but daily discharge may be in error, as inflow is determined from stage of lake and records of outflow from reservoir. As lake is 4 miles in length, the effect of wind on stage is very noticeable at times. This explains variations in inflow during low water and also the omission of discharge on certain days when weather conditions were unfavorable.

Cooperation.—Estimates of daily discharge were furnished by the Pacific Light & Power Corporation through R. C. Starr, hydraulic engineer.

Daily discharge, in second-feet, of Big Creek, near Big Creek, Cal., for the year ending Sept. 30, 1915.

Days.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.
1	12	18	(a)	22	44	2.7	122	846	1,430	251	35	(a)
2	4.5	26	5.7	.7	42	.3	110	257	1,430	200	5.0	6.2
3	7.0	34	3.8	13	66	9.2	132	110	1,290	167	27	2.9
4	13	10	15	11	7.5	34	169	408	1,110	222	18	17
5	16	12	28	15	13	15	120	276	997	153	14	27
6	21	10	.2	22	11	12	105	209	1,180	111	16	(a)
7	4.0	23	3.1	21	10	40	103	224	1,290	112	16	(a)
8	8.5	(a)	7.8	21	36	16	107	281	1,340	193	2.9	14
9	75	(a)	(a)	11	86	9.5	115	345	1,130	154	11	5.0
10	25	(a)	26	6.8	63	28	130	30	1,390	142	21	2.1
11	18	12	17	11	46	21	149	310	1,220	139	7.0	(a)
12	12	4.5	30	6.4	12	11	209	716	1,140	119	7.5	8.5
13	(a)	12	(a)	14	6.0	23	199	459	879	107	2.7	(a)
14	18	18	3.6	35	4.4	14	178	50	1,030	94	19	9.6
15	19	7.0	3.0	22	22	23	164	483	1,120	81	14	.2
16	12	(a)	6.0	8.3	13	41	198	730	765	66	(a)	13
17	(a)	6.0	10	.0	55	57	245	900	787	82	15	12
18	42	3.3	14	12	17	65	320	548	652	51	2.7	2.1
19	5.4	20	(a)	21	15	74	371	417	695	57	6.3	11
20	2.5	22	53	20	10	75	436	357	709	68	1.4	(a)
21	32	(a)	(a)	13	60	91	398	351	542	76	1.8	9.5
22	17	(a)	12	4.2	14	110	341	374	509	60	17	(a)
23	11	(a)	8.7	7.7	32	106	331	490	579	28	(a)	6.4
24	15	13	27	13	(a)	135	310	505	526	23	14	(a)
25	14	(a)	28	19	13	137	337	482	688	23	8.2	26
26	2.6	10	(a)	17	11	102	318	53	359	22	1.9	1.8
27	11	(a)	5.7	9.8	12	86	779	859	482	34	11	2.8
28	5.7	42	(a)	43	38	100	377	1,010	203	24	(a)	4.7
29	13	(a)	20	35	......	162	185	983	240	15	14	4.2
30	17	13	(a)	32	......	101	126	1,110	319	33	(a)	6.2
31	12	......	13	13	......	71	......	1,290	......	42	4.2	......

(a) Gage not read; weather unfavorable for accurate observation; discharge combined with next record.

Monthly discharge of Big Creek near Big Creek, Cal., for the year ending Sept. 30, 1915.

[Drainage area, 79 square miles.]

Month.	Discharge in second-feet.		Run-off.	
	Mean.	Per square mile.	Depth in inches on drainage area.	Total in acre-feet.
January	16.1	0.204	0.24	990
March	57.2	.724	.83	3,520
April	239	3.03	3.38	14,200
May	499	6.32	7.29	30,700
June	868	11.0	12.27	51,600
July	95.1	1.20	1.38	5,850

Note.—Monthly discharge computed by engineers of the U. S. Geological Survey.

PITMAN CREEK AT BIG CREEK, CAL.

Location.—In the E. ½ sec. 28, T. 8 S., R. 25 E., in Fresno County, just above junction with Big Creek, and about half a mile southeast of Big Creek.

Drainage area.—27 square miles (measured on topographic map by Pacific Light & Power Corporation).

Records available.—January 1, 1910, to September 30, 1915.

Gage.—Hook gage on right bank in pool above weir. Previous to 1913 a Watson water-stage recorder on right bank was used.

Discharge.—Computed from gage heights giving head on 38-foot masonry weir. The crest is a three-eighths-inch angle bolted to the masonry. Formula used: $Q=3.66L(h-H)^{\frac{3}{2}}$.

Channel and control.—See information under "Discharge."

Extremes of discharge.—1910–1915: Maximum mean daily discharge, 1,280 second feet, June 17, 1911; minimum mean daily discharge, 0.1 second-foot occurred a few days in August, 1910, and September and October, 1913.

Winter flow.—Flow for winter period determined with same degree of accuracy as that for remainder of year.

Diversions.—None.

Regulation.—None.

Accuracy.—Much care was exercised in the installation of the equipment, and results are believed to be good.

Cooperation.—Estimates of daily discharge were furnished by the Pacific Light & Power Corporation through R. C. Starr, hydraulic engineer.

Daily discharge, in second-feet, of Pitman Creek at Big Creek, Cal., for the year ending Sept. 30, 1915.

Day.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.
1	0.5	0.5	0.5	0.5	3.0	3.0	15	89	405	60	4.0	1.0
2	1.0	2.0	.5	.5	1.0	3.0	15	89	370	56	4.0	1.0
3	1.0	1.0	.5	.5	2.0	2.0	19	89	299	53	5.0	1.0
4	1.0	1.0	.5	.5	1.0	2.0	19	64	279	46	4.0	1.0
5	.5	1.0	.5	.5	1.0	2.0	34	64	84	46	3.0	1.0
6	.5	1.0	.5	.5	1.0	2.0	34	64	159	42	3.0	1.0
7	.5	1.0	.5	.5	2.0	2.0	34	59	159	35	2.0	1.0
8	.5	1.0	.5	.5	1.0	2.0	28	67	176	21	2.0	1.0
9	.5	1.0	.5	.5	3.0	2.0	28	84	324	21	2.0	1.0
10	.5	1.0	.5	.5	3.0	3.0	28	81	313	18	2.0	1.0
11	.5	1.0	.5	.5	3.0	3.0	28	84	300	17	2.0	1.0
12	.5	1.0	.5	.5	2.0	3.0	35	94	155	22	2.0	1.0
13	.5	1.0	.5	.5	2.0	3.0	65	103	202	21	2.0	1.0
14	.5	1.0	.5	.5	2.0	3.0	75	103	180	20	2.0	1.0
15	.5	1.0	.5	.5	1.5	3.0	75	92	180	19	2.0	1.0
16	.5	1.0	.5	.5	2.0	3.0	62	117	181	18	2.0	1.0
17	.5	1.0	.5	.5	3.0	4.0	77	100	181	17	2.0	1.0
18	.5	1.0	.5	.5	3.0	4.0	77	185	164	14	2.0	1.0
19	1.0	1.0	.5	.5	3.0	4.0	120	105	159	13	2.0	1.0
20	1.0	1.0	.5	.5	3.0	7.0	129	105	146	13	2.0	1.0
21	1.0	1.0	.5	.5	3.0	7.0	129	84	119	11	2.0	1.0
22	1.0	.5	.5	.5	3.0	10	125	119	125	11	2.0	1.0
23	1.0	.5	.5	.5	3.0	17	125	119	114	10	2.0	1.0
24	1.0	.5	.5	.5	3.0	22	103	139	100	9.0	2.0	1.0
25	1.0	.5	.5	.5	3.0	24	92	169	95	8.0	2.0	1.0
26	1.0	.5	.5	.5	3.0	28	103	163	82	6.0	2.0	1.0
27	1.0	.5	.5	.5	3.0	29	98	176	73	5.0	1.0	1.0
28	.5	.5	.5	3.0	3.0	23	92	214	73	4.0	1.0	1.0
29	.5	.5	.5	5.0	....	33	92	234	66	4.0	1.0	1.0
30	1.0	.5	.5	3.0	....	28	98	324	65	4.0	1.0	1.0
31	1.0	....	.5	6.0	....	28	....	382	....	4.0	1.0	....

Monthly discharge of Pitman Creek at Big Creek, Cal., for the year ending Sept. 30, 1915.

[Drainage area, 27 square miles.]

Month.	Discharge in second-feet.				Run-off.	
	Maximum.	Minimum.	Mean.	Per square mile.	Depth in inches on drainage area.	Total in acre-feet.
October	1.0	0.5	0.73	0.027	0.03	45
November	2.0	.5	.87	.032	.04	52
December	.5	.5	.50	.019	.02	31
January	6.0	.5	.98	.036	.04	60
February	3.0	1.0	2.38	.088	.09	132
March	33	2.0	9.97	.369	.43	613
April	129	15	68.5	2.54	2.83	4,080
May	382	59	128	4.74	5.46	7,870
June	405	65	178	6.59	7.35	10,600
July	60	4.0	20.9	.774	.89	1,290
August	5.0	1.0	2.19	.081	.09	135
September	1.0	1.0	1.00	.037	.04	60
The year	405	.5	34.4	1.27	17.31	25,000

NOTE.—Monthly and yearly discharge computed by engineers of the U. S. Geological Survey.

CRANE VALLEY RESERVOIR NEAR NORTH FORK, CAL.

LOCATION.—Crane Valley reservoir was formed by constructing a dam on North Fork Creek, in the E. ½ sec. 26, T. 7 S., R. 22 E., about 4½ miles north of North Fork, Madera County.

DRAINAGE AREA.—Not reported.

RECORDS AVAILABLE.—April 1, 1910, to September 30, 1915.

GAGE.—No information.

DISCHARGE MEASUREMENTS.—No information.

EXTREMES OF DISCHARGE.—1910–1915: Maximum mean daily discharge into reservoir, 2,750 second-feet January 30, 1911; minimum mean daily inflow, 2.0 second-feet October 2, 6, and 31, 1913.

DIVERSIONS.—Water is diverted into the reservoir from South Fork Creek about one-fourth mile below the mouth of Browns Creek.

REGULATION.—No information.

COOPERATION.—Daily-discharge record furnished by San Joaquin Light & Power Corporation.

The records show the total inflow into the reservoir. The water released from the reservoir flows down the natural channel of North Fork Creek to a point just above the mouth of South Fork Creek, where it is diverted into the power canal.

Daily discharge, in second-feet, into Crane Valley reservoir near North Fork, Cal., for the year ending Sept. 30, 1915.

Day.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.
1	8.0	29	7.0	12	74	73	116	130	187	65	30	10
2	8.7	14	7.0	12	218	72	102	119	222	57	27	11
3	8.2	9.7	41	12	96	71	116	156	194	55	25	12
4	8.9	8.0	39	20	74	74	100	231	198	40	20	13
5	7.8	7.8	21	13	83	75	103	161	179	50	28	14
6	8.8	7.3	19	21	58	69	97	159	187	48	16	15
7	8.2	7.9	21	16	56	62	101	166	228	52	23	13
8	9.5	8.2	14	32	299	63	87	164	212	58	8.5	16
9	8.4	8.5	20	18	266	63	79	146	194	45	16	10
10	8.2	8.1	36	19	182	53	102	151	161	50	22	10
11	8.9	8.5	16	22	116	63	110	163	147	41	17	10
12	7.8	8.0	12	16	91	50	145	280	105	54	15	12
13	7.6	7.7	11	34	84	63	153	315	123	47	17	22
14	7.2	8.2	10	65	73	57	112	213	106	45	4.6	12
15	7.5	8.6	11	18	67	84	107	191	113	49	19	13
16	7.1	8.3	21	16	161	96	107	234	118	51	8.4	13
17	7.8	8.0	43	11	296	107	107	359	116	51	15	12
18	8.4	8.0	18	8.0	134	58	121	228	99	44	22	9.7
19	8.0	8.0	17	9.5	99	113	130	256	86	32	23	12
20	20	7.5	16	13	136	109	131	202	76	52	15	12
21	9.8	7.3	12	7.0	74	91	165	167	73	35	19	14
22	9.0	7.0	9.9	10	79	114	150	159	83	31	15	13
23	8.4	7.4	9.2	10	90	100	115	183	70	52	12	14
24	8.0	7.1	9.7	23	59	103	98	160	74	31	12	9.6
25	7.6	7.0	10	41	72	98	102	178	49	40	13	12
26	7.4	7.0	11	18	73	99	85	180	48	40	12	13
27	7.0	7.0	12	80	50	100	96	193	46	33	15	14
28	7.0	7.0	11	146	119	267	91	204	50	28	18	20
29	14	7.0	12	248	....	146	222	218	52	41	19	11
30	9.2	7.0	11	99	....	118	167	212	56	29	20	13
31	8.4	....	11	86	....	116	....	207	....	31	9.2	....

Monthly discharge into Crane Valley reservoir near North Fork, Cal., for the year ending Sept. 30, 1915.

Month.	Discharge in second-feet.			Run-off (total in acre-feet).
	Maximum.	Minimum.	Mean.	
October	20	7.0	8.74	537
November	29	7.0	8.67	516
December	43	7.0	16.7	1,030
January	248	7.0	37.3	2,290
February	299	50	117	6,500
March	267	50	91.2	5,610
April	222	79	117	6,960
May	359	119	196	12,100
June	228	46	122	7,260
July	65	28	44.4	2,730
August	30	4.6	17.3	1,060
September	22	9.6	12.8	762
The year	359	4.6	65.4	47,400

NOTE.—Monthly and yearly discharge computed by engineers of the U. S. Geological Survey.

EVAPORATION FROM CRANE VALLEY RESERVOIR NEAR NORTH FORK, CAL.

Location.—In T. 7 S., R. 22 E., about 5 miles northwest of North Fork, Madera County.

Records available.—June 1, 1910, to September 30, 1915 (not complete).

Equipment.—No information.

Method.—Evaporation measured in a pan floating on the reservoir.

Elevation.—About 3,350 feet above sea level.

Cooperation.—Data furnished by San Joaquin Light & Power Corporation.

Daily evaporation in feet from Crane Valley reservoir near North Fork, Cal., for the year ending Sept. 30, 1915.

Day.	Oct.	June.	July.	Aug.	Sept.	Day.	Oct.	June.	July.	Aug.	Sept.
1	0.005	0.01	0.027	0.023	0.025	16	.005	.03	.020	.021	.020
2	.01	.01	.015	.023	.025	17		.02	.025	.022	.018
3	.015	.01	.018	.023	.022	18	.005	.015	.027	.020	.022
4	.01	.02	.025	.025	.025	19	.005	.027	.015	.022	.022
5	.015	.02	.017	.023	.027	20		.018	.020	.023	.020
6	.015	.02	.023	.024	.028	21		.025	.018	.022	.020
7	.01	.03	.020	.025	.029	22	.01	.020	.020	.022	.020
8	.01	.02	.017	.024	.025	23	.01	.022	.030	.023	.020
9	.015	.02	.018	.025	.019	24	.01	.015	.020	.020	.011
10	.01	.02	.022	.023	.025	25	.01	.014	.020	.013	.013
11	.01	.03	.013	.024	.026	26	.01	.011	.030	.027	.015
12	.015	.02	.015	.022	.024	27	.005	.010	.025	.020	.017
13	.015	.02	.020	.023	.026	28	.005	.015	.018	.021	.019
14	.01	.01	.030	.021	.022	29		.020	.039	.012	.018
15	.01	.02	.020	.022	.022	30	.005	.023	.025	.025	.014
						31	.005	....	.023	.028	....

SOUTH FORK CREEK[1] NEAR NORTH FORK, CAL.

Location.—In the SE. ¼ sec. 19, T. 8 S., R. 23 E., at concrete weir just above mouth, about 5 miles east of North Fork, Madera County.

Drainage area.—Not measured.

Records available.—April 1, 1910, to September 30, 1915.

Gage.—Watson water-stage recorder which shows head on weir.

Discharge.—Computed from gage-height record which indicates head on 100-foot, broad-crested concrete weir. Weir rating is checked by current meter measurements.

Extremes of discharge.—1910–1915: Maximum mean daily discharge, 3,000 second-feet (estimated by the San Joaquin Light & Power Corporation) January 25, 1914; minimum mean daily discharge, 1 second-foot June 30 to September 13, September 19 to October 11, and October 23 to November 11, 1910.

Diversions.—Below the mouth of Browns Creek, about 6 miles above the station, water is diverted from South Fork Creek into Crane Valley reservoir. This diversion is combined with the discharge at the gaging station in order that record will show total run-off from the watershed.

Regulation.—None.

Cooperation.—Daily-discharge record furnished by San Joaquin Light & Power Corporation.

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[1] Also known as South Fork of Willow Creek.

Daily discharge, in second-feet, of South Fork Creek near North Fork, Cal., for the year ending Sept. 30, 1915.

Day.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.
1	5.6	11	5.0	9.8	69	30	97	126	214	17	3	9
2	5.6	8.2	5.0	9.8	120	22	117	111	207	15	3	7
3	5.6	7.5	7.5	9.8	48	21	97	139	186	14	6.5	7
4	5.6	7.5	11	15	30	21	100	191	160	13	7.5	7
5	5.6	8.2	7.5	14	24	21	90	150	156	12	12	7
6	5.6	8.2	6.2	13	18	21	84	160	160	11	8	6
7	5.6	8.2	5.0	13	16	21	84	180	160	11	9.5	6
8	5.0	8.2	5.0	16	95	21	98	212	156	11	9	7
9	5.0	8.2	6.2	11	225	24	105	168	124	10	9	7
10	5.0	7.5	7.5	9.0	75	21	112	213	116	10	12	7
11	5.0	7.5	7.5	9.8	65	18	128	217	112	9	12	7
12	5.0	7.5	6.2	9.8	52	17	355	240	109	9	12	7
13	5.0	7.5	5.0	12	35	17	210	259	101	6	12	7
14	4.5	7.5	5.0	21	26	50	138	239	94	6	12	7
15	4.5	7.5	5.0	14	24	84	138	214	91	6	12	7
16	4.5	7.5	7.5	13	75	90	138	375	84	5	12	7
17	4.0	7.5	12	12	120	84	154	333	81	5	11	7
18	4.0	7.5	7.5	11	75	84	170	231	74	5	11	7
19	4.0	7.5	6.2	11	50	90	169	204	71	4.5	11	7
20	9.0	6.2	6.2	12	55	90	165	207	65	4.5	11	7
21	9.0	6.2	5.0	12	40	90	171	195	60	4	9.5	7
22	7.5	6.2	7.5	14	30	90	152	177	60	4	9	7
23	7.5	6.2	7.5	15	22	121	144	207	59	4	9	7
24	8.2	5.0	7.5	18	23	121	123	207	60	4	9	7
25	7.5	5.0	9.0	19	22	112	108	187	53	3.5	9	7
26	7.5	5.0	9.0	14	21	78	106	212	50	3	9	7
27	7.5	5.0	9.0	18	21	134	109	230	47	3	9	8
28	8.2	5.0	8.2	59	30	98	122	212	43	3	9	8
29	9.0	5.0	9.9	86	....	99	191	218	25	3	9	8
30	9.0	5.0	9.0	64	....	90	129	218	18	3	9	7
31	8.2	....	9.0	45	....	91	....	223	....	3	9	....

Monthly discharge of South Fork Creek near North Fork, Cal., for the year ending Sept. 30, 1915.

Month.	Discharge in second-feet.			Run-off (total in acre-feet).
	Maximum.	Minimum.	Mean.	
October	9.0	4.0	6.22	382
November	11	5.0	7.00	417
December	12	5.0	7.22	444
January	86	9.0	19.7	1,210
February	225	16	53.8	2,990
March	134	17	63.6	3,910
April	355	84	137	8,150
May	375	111	208	12,800
June	214	18	99.9	5,940
July	17	3	7.15	440
August	12	3	9.52	585
September	9	6	7.1	420
The year	375	3	52.0	37,700

NOTE.—Monthly and yearly discharge computed by engineers of the U. S. Geological Survey.

WHISKEY CREEK NEAR NORTH FORK, CAL.

LOCATION.—In the SE. ¼ sec. 16, T. 8 S., R. 23 E., just above highway bridge about one-fourth mile below Cascadel ranch, and 6 miles east of North Fork, Madera County.

DRAINAGE AREA.—Not measured.

RECORDS AVAILABLE.—April 1, 1910, to September 30, 1915.

GAGE.—Staff on left bank about 500 feet above bridge.

Discharge measurements.—Made by wading near gage.

Channel and control.—Gravel.

Extremes of discharge.—1910–1915: Maximum mean daily discharge, 1,000 second-feet (estimated by San Joaquin Light & Power Corporation) January 25, 1914; minimum mean daily discharge, 1 second-foot September 26 to October 6, 1913.

Diversions.—No information.

Regulation.—None.

Cooperation.—Daily-discharge record furnished by San Joaquin Light & Power Corporation.

Daily discharge, in second-feet, of Whiskey Creek near North Fork, Cal., for the year ending Sept. 30, 1915.

Day.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.
1	1.5	3	1.5	2.5	45	42	37	43	86	19	6.5	6
2	1.5	2.5	1.5	2.5	65	36	38	42	85	18	6.5	6
3	1.5	2.5	2	2.5	35	35	37	65	76	18	6.5	6
4	1.5	2.5	4.5	4.5	21	35	37	70	65	18	6.5	6
5	1.5	2.5	2	4.5	20	35	35	68	64	17	6.4	6
6	1.5	2.5	2	4.5	19	35	35	68	65	17	6.4	6
7	1.5	2.5	1.5	4.5	16	35	40	78	65	16	6.4	6
8	1.5	2.5	1.5	5	55	35	35	82	63	16	6.4	6
9	1.5	2.5	1.5	4	100	40	40	80	50	16	6.4	6
10	1.5	2	2	3	60	35	42	85	47	16	6.4	6
11	1.5	2	2	3	43	19	44	85	46	16	6.4	6
12	1.5	2	1.5	3	35	17	92	90	44	16	6.4	6
13	1.5	2	1.5	4	44	17	70	92	42	15	6.4	6
14	1	2	1.5	7.5	40	34	65	88	39	15	6.3	6
15	1	2	1.5	4.5	40	52	65	85	38	15	6.3	6
16	1	2	2	4.5	60	55	65	90	35	14	6.3	6
17	1	2	2	4	65	52	70	95	33	14	6.3	6
18	1	1.5	2.5	3.5	60	52	65	90	30	13	6.3	6
19	1	1.5	2	3.5	34	55	65	88	29	12	6.3	6
20	4	1.5	1.5	4	37	55	65	88	26	12	6.3	6
21	3.5	1.5	1.5	4	30	55	67	85	25	11	6.3	6
22	2	1.5	1.5	4	40	55	67	82	24	11	6.3	6
23	2	1.5	1.5	4.5	36	60	60	85	23	10	6.2	6
24	2	1.5	2.5	6	37	60	55	85	23	10	6.2	6
25	1.5	1.5	2	6.5	36	58	50	86	22	9.7	6.2	6
26	1.5	1.5	2	5	35	45	50	86	22	9.4	6.2	6
27	1.5	1.5	2.5	6	35	65	50	88	19	9.1	6.2	6
28	2	1.5	2.5	21	42	55	50	88	17	8.8	6.2	6
29	3	1.5	2.5	23	....	58	55	86	16	8.4	6.2	6
30	3	1.5	2.5	20	....	55	50	87	15	8.1	6.1	6
31	2.5	....	2.5	15	....	55	....	87	....	7.8	6.1	....

Monthly discharge of Whiskey Creek near North Fork, Cal., for the year ending Sept. 30, 1915.

Month.	Discharge in second-feet.			Run-off (total in acre-feet).
	Maximum.	Minimum.	Mean.	
October	4	1	1.74	107
November	3	1.5	1.95	116
December	4.5	1.5	1.98	122
January	23	2.5	6.26	385
February	100	16	42.3	2,350
March	65	17	44.9	2,760
April	92	35	53.2	3,170
May	95	42	81.2	4,990
June	86	15	41.1	2,450
July	19	7.8	13.4	824
August	6.5	6.1	6.32	389
September	6	6	6.0	357
The year	100	1	24.9	18,000

Note.—Monthly and yearly discharge computed by engineers of U. S. Geological Survey.

MERCED RIVER ABOVE ILLILOUETTE CREEK, NEAR YOSEMITE, CAL.

Location.—Three-fourths mile above power house, and 2½ miles southeast of Yosemite, Mariposa County; 1,000 feet above mouth of Illilouette Creek.

Drainage area.—118 square miles (measured on topographic maps).

Records available.—August 21 to September 30, 1915.

Gage.—Vertical enameled staff fastened to a 2 by 6 inch timber bolted to a large boulder on left bank, about 500 feet below a small island; read once a day by an employee of Yosemite National Park.

Discharge measurements.—Made by wading about 300 feet below gage.

Channel and control.—Composed of large boulders and medium-sized gravel; may shift at high stages. Banks high and not subject to overflow.

Winter flow.—Stage-discharge relation possibly affected by ice.

Diversions.—None.

Regulation.—None.

Accuracy.—Results good.

Cooperation.—Gage-height record furnished by officials of Yosemite National Park.

Discharge measurements of Merced River above Illilouette Creek, near Yosemite, Cal., during the year ending Sept. 30, 1915.

[Made by Charles Leidl.]

Date.	Gage height.	Discharge.	Date.	Gage height.	Discharge.
	Feet.	*Sec.-ft.*		*Feet.*	*Sec.-ft.*
Aug. 22	2.38	108	Sept. 26	1.48	29
22	2.38	105	27	1.47	27
23	2.38	105			

Daily discharge, in second-feet, of Merced River above Illilouette Creek, near Yosemite, Cal., for the year ending Sept. 30, 1915.

Day.	Aug.	Sept.	Day.	Aug.	Sept.	Day.	Aug.	Sept.
1		96	11		50	21	108	20
2		101	12		[a] 44	22	[a] 104	20
3		94	13		37	23	101	20
4		115	14		[a] 34	24	101	[a] 23
5		[a] 122	15		[a] 31	25	101	26
6		[a] 129	16		28	26	94	[a] 26
7		136	17		26	27	82	[a] 25
8		94	18		23	28	77	[a] 24
9		58	19		[a] 22	29	77	24
10		[a] 54	20		[a] 21	30	88	[a] 24
						31	[a] 92	

[a] Interpolated.

Note.—Discharge determined from a fairly well defined rating curve.

Monthly discharge of Merced River above Illilouette Creek, near Yosemite, Cal., for the year ending Sept. 30, 1915.

Month.	Discharge in second-feet.			Run-off (total in acre-feet).	Accuracy.
	Maximum.	Minimum.	Mean.		
August 21-31	108	77	93.2	2,030	B.
September	136	20	51.6	3,070	B.
The period				5,100	

MERCED RIVER AT HAPPY ISLES BRIDGE, NEAR YOSEMITE, CAL.

Location.—At Happy Isles Bridge, just below power house, 1½ miles southeast of Yosemite, Mariposa County.

Drainage area.—181 square miles (measured on topographic maps).

Records available.—August 23 to September 30, 1915.

Gage.—Vertical staff fastened to downstream side of large boulder which is used for right abutment of bridge; read twice a day by Pettis and Jenkins.

Discharge measurements.—Made from Clark Bridge about half a mile below gage or by wading.

Channel and control.—Bed composed of boulders; probably permanent. Banks high and not subject to overflow.

Winter flow.—Possibly slightly affected by ice.

Diversions.—None.

Regulation.—Power plant above station; water returned to river just above gage.

Accuracy.—Stage-discharge relation permanent. Rating curve well defined. Mean daily gage heights determined from two readings a day may be somewhat in error owing to operation of power plant which causes diurnal fluctuation especially during low water. Results good.

Cooperation.—Gage-height record furnished by officials of Yosemite National Park.

Discharge measurements of Merced River at Happy Isles Bridge, near Yosemite, Cal., during the year ending Sept. 30, 1915.

[Made by Charles Leidl.]

Date.	Gage height.	Discharge.	Date.	Gage height.	Discharge.
	Feet.	*Sec.-ft.*		*Feet.*	*Sec.-ft.*
Aug. 20	2.10	110	Sept. 27	1.48	29
23	2.12	116			

Daily discharge, in second feet, of Merced River at Happy Isles Bridge, near Yosemite, Cal., for the year ending Sept. 30, 1915.

Day.	Aug.	Sept.	Day.	Aug.	Sept.	Day.	Aug.	Sept.
1		136	11		51	21		19
2		104	12		42	22		18
3		104	13		40	23	104	18
4		104	14		36	24	104	21
5		97	15		31	25	104	24
6		66	16		28	26	97	24
7		73	17		28	27	90	28
8		66	18		21	28	79	25
9		63	19		21	29	79	24
10		57	20		19	30	83	21
						31	112	

Note.—Discharge determined from a well-defined rating curve.

Monthly discharge of Merced River at Happy Isles Bridge, near Yosemite, Cal., for the year ending Sept. 30, 1915.

Month.	Discharge in second-feet.			Run-off (total in acre-feet).	Accuracy.
	Maximum.	Minimum.	Mean.		
Aug. 23-31	112	79	94.7	1,690	A.
September	136	18	47.0	2,800	A.

MERCED RIVER AT YOSEMITE, CAL.

Location.—At Sentinel Bridge, at Yosemite, Mariposa County, in Yosemite National Park, half a mile above mouth of Yosemite Creek, and 1½ miles below mouth of Tenaya Creek.

Drainage area.—236 square miles.

Records available.—July, 1904, to June, 1909 (incomplete) and January 4, 1912, to September 30, 1915.

Gage.—Vertical staff on retaining wall on left bank 3 feet below the bridge; read once a day by J. W. Emmett.

Discharge measurements.—Made from bridge or by wading.

Channel and control.—Small boulders and gravel; shifts slightly during high water.

Extremes of discharge.—Maximum stage recorded during year, 9.1 feet, at 9.10 p. m. June 1 (discharge, 4,010 second-feet); minimum stage recorded, 2.20 feet November 29 and 30, and December 2 (discharge, 20 second-feet).

1904–1909 and 1912–1915: Maximum stage recorded, 9.1 feet, at 9.10 p. m., June 1, 1915 (discharge, 4,010 second-feet); minimum stage recorded, 2.25 feet, November 1, 1913 (discharge, 14 second-feet).

Winter flow.—Stage-discharge relation slightly affected by ice.

Accuracy.—Results good for days on which gage was read. Effect of ice not definitely known but believed to be slight.

Cooperation.—Gage-height record furnished by officials of Yosemite National Park

Discharge measurements of Merced River at Yosemite, Cal., during the year ending Sept. 30, 1915.

Date.	Made by—	Gage height.	Discharge.	Date.	Made by—	Gage height.	Discharge.
		Feet.	*Sec.-ft.*			*Feet.*	*Sec.-ft.*
Nov. 6	H. J. Tompkins	2.60	65	July 4	C. P. Firestone	6.10	1,950
Mar. 26	Charles Leidl	3.81	502	24	H. D. McGlashan	4.43	835
26	.....do	3.73	470	Aug. 20	Charles Leidl	2.82	114
27	.....do	3.60	387	Sept. 27	.....do	2.40	38
June 19	C. J. Emerson	6.59	2,130				

Daily discharge, in second-feet, of Merced River at Yosemite, Cal., for the year ending Sept. 30, 1915.

Day.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.
1	50	[a]108	[a]20	[a]26	110	112	[a]462	[a]705	3,760	1,720	278	113
2	48	130	20	26	132	110	462	630	2,420	1,720	[a]278	116
3	[a]46	105	25	[a]27	[a]118	110	555	530	1,930	1,720	278	136
4	44	[a]93	[a]25	28	105	112	[a]542	580	2,490	1,880	[a]265	[a]122
5	[a]40	81	[a]25	[a]29	[a]108	120	530	555	2,490	1,260	252	[a]110
6	36	65	[a]25	30	110	110	355	580	2,850	1,260	[a]241	[a]97
7	[a]35	56	25	28	[a]112	[a]111	855	680	3,000	1,260	[a]230	84
8	[a]34	48	23	30	115	112	355	780	3,150	[a]1,240	[a]219	68
9	[a]33	45	26	26	115	112	462	730	3,600	[a]1,210	208	68
10	33	42	26	[a]28	[a]125	[a]111	508	680	3,000	[a]1,190	208	[a]68
11	31	38	28	30	135	110	680	995	1,790	[a]1,160	201	68
12	28	35	[a]27	33	135	112	885	1,220	2,420	[a]1,140	174	[a]60
13	[a]27	[a]34	26	33	135	115	995	[a]1,050	1,790	[a]1,120	174	52
14	[a]26	33	[a]26	38	[a]132	138	680	885	1,720	[a]1,090	[a]172	[a]48
15	26	[a]30	[a]26	35	130	200	1,050	1,050	1,720	[a]1,070	[a]170	[a]45
16	26	28	26	38	[a]132	200	755	[a]1,660	1,790	[a]1,050	168	[a]41
17	25	36	26	[a]41	135	255	995	2,280	1,790	[a]1,020	145	[a]38
18	26	[a]30	29	[a]44	135	275	[a]1,290	1,400	1,790	[a]998	136	34
19	26	25	29	47	135	287	1,590	[a]1,170	1,790	[a]974	128	[a]32
20	33	25	33	[a]46	135	351	[a]1,460	940	1,790	[a]950	119	[a]31
21	43	[a]25	30	45	122	[a]396	1,340	[a]968	1,720	[a]926	119	29
22	53	[a]25	[a]28	42	110	440	1,100	995	1,790	[a]902	[a]122	29
23	48	[a]25	26	[a]40	110	[a]462	940	1,160	1,720	[a]879	125	29
24	47	25	26	[a]38	110	485	1,160	1,100	1,720	855	125	34
25	[a]48	[a]24	[a]26	36	110	485	1,220	[a]1,360	1,790	[a]733	119	40
26	48	[a]23	26	35	110	440	2,000	[a]1,630	1,720	[a]611	113	40
27	[a]46	22	[a]26	45	110	395	3,150	[a]1,890	1,720	[a]489	108	40
28	45	[a]21	26	56	[a]111	[a]428	3,300	[a]2,160	1,720	367	96	[a]39
29	45	20	26	85	....	462	830	2,420	1,720	367	93	38
30	65	20	[a]26	81	....	[a]462	780	1,790	1,720	282	103	34
31	[a]87	....	26	[a]96	....	[a]462	....	3,150	....	[a]280	108	....

[a] No gage height; discharge interpolated.

NOTE.—Discharge determined from two well-defined rating curves, the change occurring July 4. Discharge Sept. 22-26 estimated by comparison with that of South Fork of Merced River at Wawona; flow of the two streams not directly comparable at all seasons. River covered with ice from 1 to 2 inches thick Dec. 12-16 and for a couple of weeks in January; effect on stage-discharge relation considered insignificant.

Monthly discharge of Merced River at Yosemite, Cal., for the year ending Sept. 30, 1915.

[Drainage area, 236 square miles.]

Month.	Discharge in second-feet.				Run-off.		Accuracy.
	Maximum.	Minimum.	Mean.	Per square mile.	Depth in inches on drainage area.	Total in acre-feet.	
October	....	25	40.3	0.171	0.20	2,480	C.
November	....	20	43.9	.186	.21	2,610	C.
December	33	20	26.1	.111	.13	1,600	C.
January	....	26	40.7	.172	.20	2,500	C.
February	135	105	121	.513	.53	6,720	B.
March	485	110	261	1.11	1.28	16,000	B.
April	3,300	355	1,030	4.36	4.86	61,300	A.
May	3,150	530	1,220	5.17	5.96	75,000	B.
June	3,760	1,720	2,150	9.11	10.16	128,000	A.
July	1,880	280	1,020	4.32	4.98	62,700	C.
August	278	93	170	.720	.83	10,500	B.
September	136	29	59.5	.252	.28	3,540	C.
The year	3,760	20	515	2.18	29.62	373,000	

ILLILOUETTE CREEK NEAR YOSEMITE, CAL.

Location.—About 800 feet above mouth, half a mile above power house on Merced River, and 2 miles southeast of Yosemite, Mariposa County.

Drainage area.—61.7 square miles (measured on topographic maps).

Records available.—August 21 to September 30, 1915.

Gage.—Vertical enameled staff fastened to a 2-inch by 6-inch timber spiked to a burned stump on left bank; read once a day by an employee of the Yosemite National Park.

Discharge measurements.—Made by wading at gage.

Channel and control.—Composed of boulders. Right bank is overflowed at high water, and there are then several channels.

Extremes of discharge.—Maximum stage recorded during period, 1.63 feet August 26 and September 2 (discharge, 12 second-feet); minimum stage recorded, 1.23 feet September 21 (discharge, 1.7 second-feet).

Winter flow.—Stage-discharge relation may be affected by ice.

Diversions.—No information.

Regulation.—No information.

Accuracy.—Results good. This station was established to determine low-water flow only.

Cooperation.—Gage-height record furnished by officials of Yosemite National Park.

Discharge measurements of Illilouette Creek near Yosemite, Cal., during the year ending Sept. 30, 1915.

[Made by Charles Leidl.]

Date.	Gage height.	Discharge.	Date.	Gage height.	Discharge.
	Feet.	*Sec.-ft.*		*Feet.*	*Sec.-ft.*
Aug. 22	1.63	11	Sept. 26	1.46	5.3
23	1.63	12	27	1.45	5.2

Daily discharge in second-feet of Illilouette Creek near Yosemite, Cal., for the year ending Sept. 30, 1915.

Day.	Aug.	Sept.	Day.	Aug.	Sept.	Day.	Aug.	Sept.
1		[a]11	11		4.0	21	11	1.7
2		12	12		[a]4.0	22	[a]11	2.0
3		10	13		4.0	23	11	2.0
4		8.9	14		[a]3.9	24	11	[a]3.7
5		[a]8.1	15		[a]3.8	25	11	5.4
6		[a]7.2	16		3.7	26	12	[a]5.0
7		6.4	17		[a]3.1	27	10	[a]4.7
8		5.4	18		2.5	28	9.3	[a]4.4
9		5.2	19		[a]2.2	29	8.9	4.0
10		[a]4.6	20		[a]2.0	30	9.3	[a]3.6
						31	[a]10	

[a] Interpolated.

Note.—Discharge determined from a well-defined rating curve.

Monthly discharge of Illilouette Creek near Yosemite, Cal., for the year ending Sept. 30, 1915.

Month.	Discharge in second-feet.			Run-off (total in acre-feet).	Accuracy.
	Maximum.	Minimum.	Mean.		
Aug. 21-31	12	8.9	10.4	227	B.
September	12	1.7	4.95	295	B.

TENAYA CREEK NEAR YOSEMITE, CAL.

Location.—At Tenaya Bridge, in Yosemite National Park, five-eighths mile below outlet of Mirror Lake, five-eighths mile above junction with Merced River and 1¼ miles east of Yosemite, Mariposa County.

Drainage area.—47 square miles.

Records available.—July, 1904, to June, 1909 (incomplete); January 5, 1912, to September 30, 1915.

Gage.—Vertical staff fastened to left abutment near downstream end; read once a day irregularly by J. W. Emmett. Original staff gage was fastened to upstream side of bridge 9 feet from left abutment. About December 1, 1912, a new staff gage was installed at new datum on upstream side of bridge near right abutment. This gage was removed and the present gage installed February 4, 1913. Present gage datum is 0.55 foot higher than previous datum.

Discharge measurements.—Made from bridge or by wading.

Channel and control.—Small boulders and gravel; fairly permanent.

Extremes of discharge.—Maximum stage recorded during year, 5.85 feet at 6 p. m. May 31 (discharge, 1,120 second-feet); minimum stage recorded, 1.20 feet at 10 a. m. September 7 (discharge, 0.9 second-foot).

1904–1909 and 1912–1915: Maximum stage recorded, 8.1 feet June 16, 1906 (discharge, 1,280 second-feet); minimum stage recorded, 2.9 feet September 12 and most of October, 1906 (discharge, 0.5 second-foot). Relation between datum of gage used in 1906 and that of the present gage unknown.

Winter flow.—Stage discharge relation probably slightly affected by ice some winters, but not in 1914–15.

Diversions.—None.

Regulation.—None.

Accuracy.—Rating curve well defined except for extremely low water; gage-height record fragmentary; results fair.

Cooperation.—Gage-height record furnished by officials of the Yosemite National Park.

Discharge measurements of Tenaya Creek near Yosemite, Cal., during the year ending Sept. 30, 1915.

Date.	Made by—	Gage height.	Discharge.	Date.	Made by—	Gage height.	Discharge.
		Feet.	*Sec.-ft.*			*Feet.*	*Sec.-ft.*
Nov. 6	H. J. Tompkins	1.50	7.8	July 3	C. P. Firestone	3.20	205
Mar. 26	Charles Leidl	2.91	130	24	H. D. McGlashan	2.29	55
27	.....do	2.78	110	Aug. 20	Charles Leidl	1.37	4.3
June 19	C. J. Emerson	3.88	383	Sept. 27	.....do	1.32	2.4

Daily discharge, in second-feet, of Tenaya Creek near Yosemite, Cal., for the year ending Sept. 30, 1915.

Day.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.
1	[a]2.1	[a]19	2.4	[a]4.6	33	[a]34	[a]110	[a]285	775	[a]260	95	[a]2.6
2	[a]2.1	15	[a]3.5	4.6	33	[a]34	117	[a]211	[a]938	246	[a]56	2.8
3	[a]2.1	15	4.6	[a]5.0	[a]29	34	113	137	1,100	259	17	2.4
4	[a]2.1	12	[a]4.4	5.5	26	34	[a]122	[a]142	775	[a]251	12	2.4
5	[a]2.1	[a]10	4.2	[a]6.2	[a]28	33	131	[a]138	735	[a]170	11	[a]1.9
6	[a]2.1	7.6	[a]4.2	7.0	[a]30	[a]33	[a]116	[a]142	775	[a]170	[a]10	[a]1.4
7	2.1	7.0	4.2	[a]7.2	33	33	100	197	[a]785	[a]170	9.6	.9
8	[a]2.1	6.1	[a]4.2	[a]7.4	[a]33	34	[a]100	[a]242	[a]795	[a]163	[a]8.6	4.6
9	[a]2.1	4.9	[a]4.2	7.6	[a]33	[a]33	101	[a]214	[a]805	[a]156	7.6	3.7
10	2.1	4.6	4.2	[a]7.6	33	32	[a]143	[a]197	815	[a]149	8.0	[a]3.0
11	[a]2.1	4.6	[a]4.3	[a]7.6	[a]36	27	[a]186	[a]330	[a]658	[a]142	[a]6.1	2.4
12	[a]2.1	4.6	[a]4.4	7.6	[a]40	33	[a]229	420	502	[a]135	[a]4.2	[a]2.6
13	[a]2.1	4.6	4.6	[a]8.6	44	[a]37	272	330	[a]476	[a]128	2.4	2.8
14	2.1	[a]5.4	[a]4.6	9.6	[a]42	[a]42	197	246	450	[a]121	5.2	[a]2.6
15	2.1	[a]6.2	4.6	[a]9.6	40	47	[a]298	[a]298	[a]468	[a]114	[a]5.8	[a]2.5
16	2.1	7.0	[a]4.6	[a]9.6	44	60	246	[a]435	485	[a]107	27	2.4
17	2.1	[a]6.0	4.6	[a]9.6	47	74	[a]268	572	[a]460	[a]100	[a]15	[a]2.8
18	2.1	[a]5.1	[a]4.6	9.6	47	72	390	390	435	[a]93	4.4	3.3
19	2.1	4.2	4.6	[a]10	47	85	[a]450	[a]309	390	[a]86	4.2	[a]3.0
20	2.4	[a]3.3	[a]4.6	[a]11	44	112	450	[a]228	420	[a]79	3.9	[a]2.7
21	3.5	2.4	4.6	[a]11	40	[a]120	[a]400	[a]249	[a]408	[a]72	3.7	2.4
22	4.2	[a]2.4	[a]4.8	12	40	129	300	[a]270	[a]397	[a]66	[a]3.6	[a]2.4
23	6.1	2.4	[a]5.0	12	36	[a]146	330	330	[a]386	[a]60	3.5	[a]2.4
24	7.6	[a]2.4	5.2	12	36	162	[a]330	[a]342	375	54	3.5	[a]2.5
25	7.0	2.4	[a]5.0	[a]12	33	162	[a]288	[a]355	345	[a]47	3.3	[a]2.6
26	[a]6.2	[a]2.4	[a]4.8	[a]12	33	131	246	468	330	[a]40	3.3	[a]2.7
27	5.5	[a]2.4	4.6	15	[a]34	85	234	735	[a]316	33	3.3	2.8
28	[a]5.8	2.4	[a]4.6	[a]19	34	[a]108	[a]276	775	[a]302	26	2.8	[a]2.8
29	6.1	[a]2.2	4.6	[a]24	....	131	[a]318	815	[a]288	24	2.8	2.8
30	[a]32	2.1	[a]4.6	24	....	98	360	735	[a]274	[a]22	2.8	[a]2.8
31	[a]25	....	[a]4.6	[a]28	....	[a]104	....	895	....	[a]68	2.4	....

[a] Estimated by interpolation or by comparison with records of flow of Merced River at Yosemite and Yosemite Creek at Yosemite.

NOTE.—Discharge determined from a rating curve well defined above 6 second-feet.

Monthly discharge of Tenaya Creek near Yosemite, Cal., for the year ending Sept. 30, 1915.

[Drainage area, 47 square miles.]

Month.	Discharge in second-feet.				Run-off.		Accuracy.
	Maximum.	Minimum.	Mean.	Per square mile.	Depth in inches on drainage area.	Total in acre-feet.	
October	32	2.1	4.88	0.104	0.12	300	D.
November	19	2.1	5.86	.125	.14	349	C.
December	5.2	2.4	4.45	.095	.11	274	C.
January	28	4.6	10.9	.232	.27	670	C.
February	47	26	36.7	.781	.81	2,040	B.
March	162	27	74.2	1.58	1.82	4,560	B.
April	450	100	241	5.13	5.72	14,300	B.
May	895	137	369	7.85	9.05	22,700	C.
June	1,110	274	549	11.7	13.06	32,700	B.
July	260	22	116	2.47	2.85	7,130	
August	95	2.4	11.2	.238	.27	689	C.
September	4.6	.9	2.63	.056	.06	156	C.
The year	1,100	.9	119.0	2.53	34.28	85,900	

YOSEMITE CREEK AT YOSEMITE, CAL.

Location.—At highway bridge in Yosemite National Park, one-fourth mile northwest of Yosemite, Mariposa County, and half a mile above junction with Merced River.

Drainage area.—43.2 square miles (measured on topographic maps).

Records available.—July, 1904, to June, 1909 (incomplete), and January 4, 1912, to September 30, 1915.

Gage.—Staff in two sections; upper section, vertical, fastened to left abutment near downstream end; lower, inclined, fastened to boulder in front of upper section; read once a day, irregularly, by J. W. Emmett. Original staff gage was on tree on right bank 50 feet above bridge. January 4, 1912, new staff gage was installed on tree on right bank 25 feet above bridge at approximately same datum. Present gage was installed February 5, 1913, at datum 3.04 feet higher than that of gages previously used.

Discharge measurements.—Made from bridge or by wading.

Channel and control.—Composed of fine gravel and sand; fairly permanent.

Extremes of discharge.—Maximum stage recorded during year and periods 1904–1909 and 1912–1915: 8.5 feet at 6.30 p. m. June 8 (discharge, 1,500 second-feet; determined from extension of rating curve and may be subject to error); minimum stage recorded, 2.50 feet at 9.15 a. m. September 9 when there was no flow past the gage.

Winter flow.—Stage-discharge relation slightly affected by ice.

Diversions.—None.

Regulation.—None.

Accuracy.—Rating curves well defined but gage-height record is fragmentary; results fair.

Cooperation.—Gage-height record furnished by officials of Yosemite National Park.

Discharge measurements of Yosemite Creek at Yosemite, Cal., during the year ending Sept. 30, 1915.

Date.	Made by—	Gage height.	Discharge.	Date.	Made by—	Gage height.	Discharge.
		Feet.	*Sec.-ft.*			*Feet.*	*Sec.-ft.*
Nov. 6	H. J. Tompkins	2.80	1.8	July 4	C. P. Firestone	4.09	166
Mar. 26	Charles Leidl	3.76	94	24	H. D. McGlashan	3.08	25
27	do	3.65	75	Aug. 21	Charles Leidl	2.70	1.6
June 19	Lasley Lee	4.76	298	Sept. 27	do	2.68	.4

Daily discharge, in second-feet, of Yosemite Creek at Yosemite, Cal., for the year ending Sept. 30, 1915.

Day.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept
1	1.1	12	1.1	a1.1	a8.1	a8.4	83	184	950	a160	11.0	0.7
2	1.1	a7.5	a1.2	1.1	8.1	8.1	107	507	750	a160	a10	.8
3	1.1	3.0	a1.3	a1.1	a8.6	14	132	325	800	a160	9.8	.2
4	a1.1	a3.0	1.3	1.1	9.0	4.5	a111	a237	700	167	9.8	a.2
5	a1.1	3.0	a1.3	a1.4	a9.0	14	a90	149	700	a108	5.0	a.2
6	a1.1	3.6	1.3	1.5	a9.0	a14	69	124	675	a108	a5.0	a.2
7	a1.1	2.4	a1.1	1.3	9.0	14	a76	149	950	a108	5.0	.2
8	a1.1	1.5	a.9	a1.2	a10	14	83	149	1,180	a103	a4.8	.2
9	a1.1	1.5	.7	1.1	a11	a14	83	202	780	a98	4.6	.0
10	1.1	1.3	1.0	a1.1	12	a13	a151	a242	384	a93	a4.4	.6
11	1.0	1.2	1.1	a1.1	12	12	220	281	650	a88	4.2	1.1
12	1.0	1.3	a.9	1.1	3.0	12	220	507	586	a83	a3.9	a.9
13	a1.0	a1.4	.7	1.6	3.9	23	220	260	494	a78	a3.7	.7
14	a1.0	1.5	a.6	2.1	12	19	211	211	264	a73	a3.5	a.7
15	1.0	a1.5	.5	1.3	a16	28	166	325	167	a68	a3.8	a.7
16	1.0	1.5	.5	a1.3	19	43	325	a502	167	a63	3.1	a.7
17	1.0	1.5	1.1	a1.4	19	55	369	a680	351	a58	a2.7	a.7
18	a1.0	.4	a1.1	a1.4	9.0	69	347	a450	351	a53	2.8	.7
19	1.0	.5	a1.1	1.5	15	83	303	220	167	a48	1.6	a.7
20	a3.1	1.1	1.1	a1.5	9.0	83	a292	211	167	a43	2.0	a.7
21	6.8	1.1	a1.1	1.5	9.0	a108	281	184	149	a38	2.0	a.8
22	11	a1.1	1.1	3.9	9.0	132	220	347	167	a34	1.2	a.8
23	9.0	1.1	a1.1	1.1	a7.9	149	a272	260	167	a30	2.0	a.8
24	9.0	a1.1	a1.1	a1.1	6.8	140	325	325	167	26	2.8	a.9
25	a6.0	a1.1	1.1	a1.2	6.8	91	a303	369	167	a24	1.6	a.9
26	3.0	a1.1	a1.1	1.3	7.6	69	a281	651	149	a22	1.2	a.9
27	a3.0	1.1	1.1	a2.9	9.0	76	260	900	167	a20	1.1	1.0
28	3.0	a1.1	a1.1	4.5	a8.7	a76	a240	950	167	18	2.3	.5
29	3.9	1.1	1.1	8.1	....	76	220	800	149	5.0	1.2	a.5
30	25	a1.1	a1.1	a8.1	....	a78	a202	850	149	a7.0	.8	a.5
31	a18	....	1.1	a8.1	....	a80	....	a900	....	a9.0	.7	....

[a] Estimated by interpolation or by comparison with records of flow of Merced River at Yosemite and Tenaya Creek near Yosemite.

NOTE.—Discharge determined from two rating curves, as follows: Oct. 1 to June 7, fairly well defined; and June 8 to Sept. 30, well defined between 4 and 700 second-feet.

Monthly discharge of Yosemite Creek at Yosemite, Cal., for the year ending Sept. 30, 1915.

Month.	Discharge in second-feet.			Run-off (total in acre-feet).	Accuracy.
	Maximum.	Minimum.	Mean.		
October	25	1.0	3.90	240	
November	12	.4	2.06	123	
December	1.3	.5	1.03	63	
January	8.1	1.1	2.20	135	
February	19	3.0	9.88	549	C.
March	149	4.5	52.3	3,220	B.
April	369	69	209	12,400	B.
May	950	124	402	24,700	B.
June	1,180	149	428	25,500	A.
July	167	5.0	69.5	4,270	
August	11	.7	3.75	231	D.
September	1.1	.0	.62	37	
The year	1,180	.0	98.7	71,500	

SOUTH FORK OF MERCED RIVER NEAR WAWONA, CAL.

LOCATION.—In the SE. ¼ sec. 33, T. 4 S., R. 21 E., opposite United States military camp in Sierra National Forest, and 1 mile below Wawona, Mariposa County. Big Creek enters half a mile above and Rush Creek three-fourths of a mile below the station.

DRAINAGE AREA.—131 square miles (measured on topographic maps).

RECORDS AVAILABLE.—December 15, 1910, to September 30, 1915.

GAGE.—Vertical staff fastened to an alder tree on left bank, read once a day by A. C. Leonard. It was installed August 22, 1911, and is 250 feet below the site of original gage, which was a vertical staff fastened to the center pier of the footbridge that was destroyed by high water January 30, 1911. Original datum not maintained.

DISCHARGE MEASUREMENTS.—Made from cable at gage or by wading.

CHANNEL AND CONTROL.—Gravel and boulders; probably permanent.

EXTREMES OF DISCHARGE.—Maximum stage recorded during year, 6.0 feet at 6 p. m., June 8 (discharge, 2,500 second-feet); minimum stage recorded, 1.9 feet, September 17 to 23 and 27 to 30 (discharge, 5 second-feet).

1910–1915: Maximum stage recorded, 7.2 feet, January 26 and February 19 and 20, 1914 (discharge, 3,770 second-feet); minimum stage recorded, 1.8 feet, October 14, 19, 20, 22, and 23, 1912 (discharge, 8 second-feet). A miscellaneous measurement made September 24, 1910, indicated a flow of 2.6 second-feet.

WINTER FLOW.—Stage-discharge relation not affected by ice.

DIVERSIONS.—The ranch of the Wawona Co. is irrigated from a tributary above the station.

REGULATION.—None.

ACCURACY.—Results good.

COOPERATION.—Station maintained in cooperation with United States Forest Service. Gage-height record furnished by A. C. Leonard, park ranger.

Discharge measurements of South Fork of Merced River near Wawona, Cal., during the year ending Sept. 30, 1915.

Date.	Made by—	Gage height.	Discharge.
		Feet.	*Sec.-ft.*
Nov. 7	H. J. Tompkins	2.20	23
July 26	H. D. McGlashan	2.61	82

Daily discharge, in second-feet, of South Fork of Merced River near Wawona, Cal., for the year ending Sept. 30, 1915.

Day.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.
1	23	28	330	805	80	545	1,360	2,000	485	45	15
2	23	28	330	735	80	545	1,280	2,000	430	45	15
3	23	33	380	605	60	545	1,360	1,540	380	45	15
4	23	60	380	485	60	545	1,280	1,190	285	45	15
5	23	60	380	380	80	485	1,280	2,300	244	45	8.5
6	23	60	430	285	80	485	1,360	1,540	244	45	8.5
7	23	60	430	204	80	485	1,360	1,620	204	45	8.5
8	23	80	430	204	104	545	1,280	2,500	204	33	8.5
9	23	80	430	204	104	545	1,190	1,720	204	33	8.5
10	23	80	430	244	104	545	1,110	1,720	204	33	8.5
11	23	80	485	244	133	805	1,110	1,540	204	33	8.5
12	23	104	485	244	133	875	1,190	1,110	166	23	8.5
13	23	104	485	244	133	950	1,280	1,540	166	23	8.5
14	23	104	485	285	133	950	1,190	1,540	166	23	8.5
15	23	133	485	330	133	875	1,620	1,720	166	23	8.5
16	23	133	485	380	133	1,030	1,720	1,540	166	23	8.5
17	23	133	485	204	244	1,030	1,620	1,540	166	23	5
18	23	166	485	133	285	1,110	1,720	1,440	133	23	5
19	23	166	485	166	330	1,110	1,810	1,110	133	23	5
20	23	166	485	45	430	1,190	1,720	1,280	133	23	5
21	23	166	485	45	430	1,190	1,110	1,360	104	23	5
22	23	204	545	45	485	1,190	735	1,190	104	23	5
23	23	244	545	45	485	1,190	805	1,110	104	23	5
24	23	244	605	60	545	1,280	950	950	104	23	8.5
25	23	285	605	60	545	1,280	670	670	80	23	8.5
26	23	285	605	60	545	1,190	805	605	80	15	8.5
27	23	285	670	60	605	1,190	1,440	545	60	15	5
28	23	285	805	80	605	1,280	1,720	545	60	15	5
29	23	285	875	....	605	1,360	1,620	485	45	15	5
30	23	285	950	....	545	1,280	1,360	430	45	15	5
31	....	285	950	....	545	....	2,300	....	45	15	....

NOTE.—Discharge determined from a rating curve well defined between 10 and 2,200 second-feet. Discharge, Nov. 1-6, estimated. Mean discharge for October estimated at 19 second-feet.

Monthly discharge of South Fork of Merced River near Wawona, Cal., for the year ending Sept. 30, 1915.

[Drainage area, 131 square miles.]

Month.	Discharge in second-feet.				Run-off.	
	Maximum.	Minimum.	Mean.	Per square mile.	Depth in inches on drainage area.	Total in acre-feet.
October	....	....	[a] 19	0.145	0.17	1,170
November	23	23	23.0	.176	.20	1,370
December	285	28	152	1.16	1.34	9,350
January	950	330	530	4.05	4.67	32,600
February	805	45	246	1.88	1.96	13,700
March	605	60	286	2.18	2.51	17,600
April	1,360	485	921	7.03	7.84	54,800
May	2,300	670	1,330	10.2	11.76	81,800
June	2,500	430	1,350	10.3	11.49	80,300
July	485	45	171	1.31	1.51	10,500
August	45	15	27.7	.211	.24	1,700
September	15	5	8.08	.062	.07	481
The year	2,500	....	422	3.22	43.76	305,000

[a] Estimated.

TUOLUMNE RIVER AT HETCH HETCHY CABIN, NEAR SEQUOIA, CAL.

Location.—Near east line of sec. 10, T. 1 N., R. 20 E., in Hetch Hetchy Valley, in Yosemite National Park, half a mile above junction with Falls Creek, 2 miles above Hetch Hetchy dam site, 12 miles by trail from Hog Ranch (Portulaca), and about 12½ miles northeast of Sequoia, Tuolumne County.

Drainage area.—Not measured.

Records available.—October 1, 1910 to September 30, 1915.

Gage.—Lietz water-stage recorder on left bank 250 feet below Hetch Hetchy cabin.

Discharge measurements.—Made from cable 25 feet upstream from gage or by wading.

Channel and control.—Bed composed of gravel; fairly permanent. Both banks high but subject to overflow in extreme floods.

Extremes of discharge.—Maximum stage during year from water-stage recorder, 12.03 feet at 12 p. m. May 31 (discharge, determined from extension of rating curve, 7,580 second-feet); minimum stage, from water-stage recorder, 0.04 foot from 4 to 10 a. m. December 1 (discharge, 25 second-feet).

1910–1915: Maximum stage recorded, 14.52 feet, June 18, 1911 (discharge, 9,250 second-feet); minimum stage recorded, 0.60 foot December 24 and 25, 1911 (discharge 14 second-feet).

Winter flow.—Stage-discharge relation at times affected by ice.

Diversions.—None.

Regulation.—None.

Accuracy.—Results good.

Discharge measurements of Tuolumne River at Hetch Hetchy cabin, near Sequoia, Cal., during the year ending Sept. 30, 1915.

Date.	Made by—	Gage height.	Discharge.	Date.	Made by—	Gage height.	Discharge.
		Feet.	*Sec.-ft.*			*Feet.*	*Sec.-ft.*
Oct. 6	Lasley Lee	0.29	48	May 8	C. J. Emerson	4.10	1.310
14	do	.16	33	31	do	9.22	5,110
Nov. 26	do	.12	31	June 1	do	10.35	5,840
30	W. V. Hardy	.08	28	2	do	8.52	4,620
Dec. 29	do	.22	36	3	do	7.52	3,700
Jan. 8	do	.32	52	4	do	6.90	3,300
18	do	.67	92	24	do	7.32	3.580
27	do	.58	85	July 12	do	5.55	2.320
28	do	.95	148	15	do	4.35	1.420
Feb. 25	C. J. Emerson	1.33	239	18	Lasley Lee	3.75	1,110
Mar. 2	do	1.40	245	24	do	4.06	1,280
18	do	2.54	568	27	do	2.79	654
31	do	2.38	501	28	do	2.50	518
Apr. 12	do	4.24	1.310	29	do	2.23	435
17	do	4.57	1,530	Aug. 4	C. J. Emerson	1.70	316
19	do	5.60	2,240	12	do	1.21	188
20	do	5.98	2,550	16	do	1.10	162
22	do	4.91	1,780	21	do	.86	120
May 1	do	3.53	987	Sept. 21	Lasley Lee	.13	31
3	do	3.08	773				

Daily discharge, in second-feet, of Tuolumne River at Hetch Hetchy cabin, near Sequoia, Cal., for the year ending Sept. 30. 1915.

Day.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.
1	70	159	29	44	264	268	675	1,020	6,400	3,510	315	129
2	67	190	33	45	280	250	848	892	5,110	3,510	312	134
3	61	150	38	48	196	252	1,020	825	4,310	3,350	318	134
4	57	128	46	56	190	254	965	915	3,590	3,110	315	136
5	52	113	44	56	190	261	758	965	4,070	2,630	290	120
6	49	102	43	57	202	250	615	1,040	5,190	1,840	266	108
7	48	92	45	52	184	236	635	1,200	5,860	1,700	243	96
8	48	84	40	55	292	221	575	1,280	6,310	1,840	232	91
9	47	77	36	52	330	221	695	1,170	6,220	2,120	228	85
10	46	72	46	56	288	208	990	1,250	5,950	2,190	219	80
11	45	67	45	61	254	210	1,280	2,190	4,950	2,400	210	77
12	43	62	44	61	210	223	1,460	2,400	3,670	2,260	200	67
13	40	60	42	69	214	228	1,520	1,980	3,270	1,910	178	61
14	38	58	44	102	232	310	1,090	1,490	3,670	1,700	172	58
15	36	56	49	72	247	396	1,060	1,700	4,150	1,400	170	52
16	33	51	52	67	320	488	1,310	2,470	4,310	1,250	170	50
17	32	50	51	69	437	558	1,840	3,670	3,990	1,170	165	46
18	32	48	48	68	338	595	2,190	2,400	3,990	1,020	152	42
19	45	44	51	69	300	615	2,400	1,840	3,830	915	141	36
20	84	40	50	75	271	655	2,470	1,520	3,510	940	134	37
21	124	36	47	75	234	758	2,120	1,400	3,670	1,040	129	36
22	110	35	47	72	232	825	1,770	1,640	3,910	1,310	124	36
23	110	36	47	66	219	915	1,580	1,910	3,990	1,490	129	36
24	110	37	46	66	221	940	1,490	2,050	3,830	1,430	138	37
25	105	36	48	69	225	915	1,400	1,640	3,430	1,040	141	42
26	102	35	47	68	234	735	1,280	2,120	2,870	848	129	48
27	104	31	45	87	247	595	1,310	3,670	3,110	655	118	52
28	102	35	43	138	288	825	1,520	4,550	3,430	540	108	54
29	102	38	43	204	....	780	1,400	4,470	3,590	455	105	51
30	192	31	44	163	....	615	1,200	5,110	3,430	410	113	45
31	178	....	45	168	....	540	....	5,680	....	354	115	....

NOTE.—Discharge determined from a rating curve well defined between 255 and 5,500 second-feet and fairly well defined below 255 second-feet. Control frozen over on cold nights but ice melted during the day; amount of backwater due to ice was fairly well known and gage-height graph was corrected.

Monthly discharge of Tuolumne River at Hetch Hetchy cabin, near Sequoia, Cal., for the year ending Sept. 30, 1915.

Month.	Discharge in second-feet.			Run-off (total in acre-feet).	Accuracy.
	Maximum.	Minimum.	Mean.		
October	192	32	74.6	4,590	B.
November	190	31	68.4	4,070	B.
December	52	29	44.5	2,740	B.
January	204	44	77.7	4,780	B.
February	437	184	255	14,200	B.
March	940	208	488	30,000	A.
April	2,470	575	1,320	78,600	A.
May	5,680	825	2,140	132,000	A.
June	6,400	2,870	4,250	253,000	A.
July	3,510	354	1,620	99,600	A.
August	318	105	186	11,400	A.
September	136	36	69.2	4,120	B.
The year	6,400	29	883	639,000	

TUOLUMNE RIVER AT HETCH HETCHY DAM SITE, NEAR SEQUOIA, CAL.

Location.—In the NW. ¼ sec. 16, T. 1 N., R. 20 E., in Yosemite National Park, at dam site at lower end of Hetch Hetchy Valley, 1½ miles below junction with Falls Creek, and about 11 miles northeast of Sequoia, Tuolumne County.

Drainage area.—459 square miles.[1]

Records available.—December 1, 1910 to August 31, 1915 (not complete), when station was discontinued.

Gage.—Lietz water-stage recorder on left bank at dam site.

Discharge measurements.—Made from car and cable 50 feet upstream from gage, or by wading.

Channel and control.—The bed of channel, composed of fine sand and gravel shifts. Control, composed of boulders, shifted a little but was fairly satisfactory until construction began. Banks high and not subject to overflow.

Extremes of discharge.—Maximum stage during year from water-stage recorder, 21.65 feet from 3 to 4 a. m. June 1 (discharge, 8,960 second-feet); minimum stage from water-stage recorder, −0.60 foot at 12 m. December 1 (discharge, 33 second-feet).

1911–1915: Maximum stage recorded, 24.8 feet June 18, 1911 (discharge, 11,400 second-feet); minimum discharge, 17 second-feet December 24 and 25, 1911.

Winter flow.—Stage-discharge relation slightly affected by ice.

Diversions.—None.

Regulation.—None.

Accuracy.—Natural shifts in control during the fall and artificial shifts due to construction work at the dam site were so numerous that the station was discontinued; changes in control fairly well covered by current-meter measurements· results good.

Discharge measurements of Tuolumne River at Hetch Hetchy dam site, near Sequoia, Cal., during the year ending Sept. 30, 1915.

Date.	Made by—	Gage height.	Discharge.	Date.	Made by—	Gage height.	Discharge.
		Feet.	*Sec.-ft.*			*Feet.*	*Sec.-ft.*
Nov. 26	Lasley Lee	−0.50	39	Apr. 19	C. J. Emerson	12.45	2,810
30	W. V. Hardy	− .52	34	20	do	13.06	3,100
Dec. 25	do	− .07	60	22	do	11.05	2,120
Jan. 8	do	.05	64	28	do	10.20	1,830
18	do	.52	113	May 3	do	7.26	913
22	do	.25	93	10	do	8.95	1.400
27	do	.28	98	24	do	12.22	2.710
27	do	.44	113	31	do	17.85	5,800
28	do	1.26	213	June 4	do	14.41	3,790
28	do	1.19	198	10	do	18.15	6,220
29	do	2.42	325	25	do	14.60	3,970
Feb. 15	do	2.52	362	July 8	do	10.99	2,120
21	C. J. Emerson	2.34	333	17	Lasley Lee	9.20	1,510
25	do	2.20	315	18	do	8.50	1,260
27	do	4.50	326	24	do	10.85	2,110
Mar. 1	do	4.65	365	26	do	7.95	1,100
3	do	4.48	347	27	do	6.93	793
8	do	3.34	307	28	do	6.24	676
17	do	5.89	687	29	do	5.71	558
22	do	7.30	989	Aug. 2	C. J. Emerson	4.66	384
24	do	8.14	1,190	9	do	3.90	261
30	do	6.33	760	17	do	1.04	185
Apr. 8	do	6.07	720	21	do	.87	146
13	do	10.20	1,920	28	do	.40	121
14	do	8.36	1,260	Sept. 2	do	.83	149
17	do	10.29	1,910				

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[1] Freeman, J. R., The Hetch Hetchy water supply for San Francisco, p. 24, 1912.

Daily discharge, in second-feet, of Tuolumne River at Hetch Hetchy dam site, near Sequoia, Cal., for the year ending Sept. 30, 1915.

Day.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.
1	88	212	35	52	383	374	820	1,300	7,830	4,250	416
2	85	242	38	55	395	350	1,000	1,130	6,790	4,190	384
3	81	175	42	60	266	350	1,260	1,060	5,390	4,030	384
4	78	139	50	70	250	350	1,260	1,160	4,310	3.710	384
5	75	117	48	68	260	362	980	1,200	4,890	3,290	352
6	72	101	50	69	276	350	798	1,300	6,130	2,260	336
7	69	90	52	65	260	368	798	1,480	7.310	2,000	320
8	69	81	48	67	359	313	758	1,600	7,830	2,170	304
9	68	73	46	65	461	313	864	1,440	7,830	2,530	276
10	67	70	57	68	398	294	1,200	1,540	7,030	2,630	262
11	64	67	56	70	362	303	1,540	2,740	6,150	2,830	254
12	62	63	53	68	322	323	1,810	3,080	4,490	2,730	215
13	60	61	49	77	322	323	1,960	2,690	4.010	2,260	190
14	56	58	52	120	339	420	1,380	1,850	4,370	2,120	180
15	53	56	62	97	374	526	1,320	2,010	5,090	1,740	180
16	50	52	56	96	437	626	1.560	2,830	5,270	1,560	190
17	48	50	58	96	585	698	2,200	4.670	4,910	1,460	190
18	47	48	58	96	465	758	2,740	2,980	4,910	1,260	180
19	55	45	65	95	411	778	3,060	2,240	4,790	1,110	170
20	120	42	60	100	386	820	3,180	1,840	4,310	1,140	155
21	161	40	59	104	339	955	2,780	1,640	4,370	1,170	145
22	138	38	55	95	334	1,060	2,240	1,780	4,790	1,670	145
23	134	38	55	87	322	1,160	2,040	2,350	4,850	1,920	145
24	140	39	61	85	322	1,200	1,840	2,640	4,670	1,880	150
25	136	39	59	88	328	1,200	1,740	2,080	4,250	1,360	155
26	138	37	58	85	339	1,000	1,560	2,460	3,530	1,080	125
27	141	37	58	100	350	798	1,560	4,190	3,730	816	125
28	142	39	55	210	398	1,060	1,920	5,490	4.190	680	120
29	144	42	54	282	....	1,000	1,780	5,490	4,370	578	120
30	284	38	54	230	....	820	1,560	5,010	4,250	504	125
31	290	....	53	240	....	718	....	6,590	....	450	130

NOTE.—Discharge determined from nine rating curves, mostly well defined, applicable for short periods. Discharge Oct. 4 interpolated; Jan. 16–18, Feb. 26, May 14–16, 22, 23, 27–31, June 5–9, July 2–6, and 8–13 estimated, because there was no record, by comparison with record of flow for the station below the dam site.

Monthly discharge of Tuolumne River at Hetch Hetchy dam site, near Sequoia, Cal., for the year ending Sept. 30, 1915.

Month.	Discharge in second-feet.			Run-off (total in acre-feet).	Accuracy.
	Maximum.	Minimum.	Mean.		
October	290	47	104	6,400	A.
November	242	37	74.3	4,420	A.
December	65	35	53.4	3,280	A.
January	282	52	102	6,270	A.
February	585	250	359	19,900	A.
March	1,200	294	644	39,600	A.
April	3,180	758	1,650	98,200	A.
May	6,590	1,060	2,610	160,000	B.
June	7,830	3,530	5,220	311,000	B.
July	4,250	450	1,980	122,000	B.
August	416	120	221	13,600	B.
The period	....	....	....	785,000	

TUOLUMNE RIVER BELOW HETCH HETCHY DAM SITE, NEAR SEQUOIA, CAL.

Location.—In the SW. ¼ SE. ¼ sec. 17, T. 1 N., R. 20 E., in Yosemite National Park about three-fourths mile below Hetch Hetchy dam site and about 11 miles northeast of Sequoia, Tuolumne County.

Drainage area.—Not measured.

Records available.—December 20, 1914, to September 30, 1915. This station was established to take the place of the station at the dam site when it became necessary to discontinue that station on account of construction.

Gage.—Gurley weight-driven, printing water-stage recorder on left bank. Difference in elevation between the zero of this gage and that of the gage at the dam site is 53.15 feet.

Discharge measurements.—Made from cable 30 feet below gage or by wading.

Channel and control.—Bed of channel composed of boulders; control of boulders and solid rock, both permanent. Channel at measuring section smoothed off by removing some boulders. Banks high and not subject to overflow.

Extremes of discharge.—Maximum stage during period of records, from water-stage recorder, 12.55 feet at 4 a. m. June 1 (discharge, 9,040 second-feet); minimum stage from water-stage recorder, 1.60 feet September 22 and 23 (discharge, 36 second-feet).

Winter flow—Stage-discharge relation not affected by ice.

Diversions.—None.

Regulation.—None.

Accuracy.—Conditions favorable for excellent results, but gage stopped during parts of January, February, March and July; daily discharge for these periods was estimated from records of flow for the dam-site station. Results good.

Discharge measurements of Tuolumne River below Hetch Hetchy dam site, near Sequoia, Cal., during the year ending Sept. 30, 1915.

Date.	Made by—	Gage height.	Discharge.	Date.	Made by—	Gage height.	Discharge.
		Feet.	*Sec.-ft.*			*Feet.*	*Sec.-ft.*
Nov. 24	W. V. Hardy	1.64	37	Apr. 1	C. J. Emerson	6.21	827
30	.....do	1.60	48	8	.....do	6.00	763
Dec. 25	.....do	2.12	66	12	.....do	7.98	1,640
Jan. 8	.....do	2.22	68	20	.....do	9.42	2,990
20	.....do	2.66	102	22	.....do	8.55	2,120
22	.....do	2.52	87	May 10	.....do	7.52	1,340
25	.....do	2.45	78	25	.....do	8.35	1,920
28	.....do	3.40	191	June 1	.....do	11.58	6,630
Feb. 13	.....do	4.14	297	5	.....do	10.33	4,110
14	.....do	4.14	318	30	.....do	10.11	3,760
23	C. J. Emerson	4.10	323	July 7	.....do	8.46	2,020
Mar. 8	.....do	4.09	322	25	.....do	7.53	1,340
15	.....do	5.10	507	Aug. 7	.....do	4.07	330
16	.....do	5.48	602	12	.....do	3.52	232
17	.....do	5.79	679	20	.....do	2.96	156
22	.....do	6.61	946	30	.....do	2.70	133
23	.....do	7.14	1,180	Sept. 21	Lasley Lee	1.62	36

Note.—Not much weight was given to the first nine measurements because standard soundings were used in making them.

Daily discharge, in second-feet, of Tuolumne River below Hetch Hetchy dam site, near Sequoia, Cal., for the year ending Sept. 30, 1915.

Day.	Dec.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.
1	....	57	398	377	825	1,280	7,830	4,350	395	142
2	....	60	410	359	1,010	1,090	7,070	4,190	377	153
3	....	62	286	359	1,280	1,010	5,490	4,030	377	150
4	....	75	270	361	1,280	1,090	4,350	3,710	386	153
5	....	76	278	373	1,010	1,180	4,890	3,290	342	135
6	....	77	294	361	790	1,230	6,130	2,260	326	115
7	....	72	270	381	825	1,450	7,310	2,090	318	103
8	....	74	367	326	760	1,570	7,830	2,170	294	96
9	....	71	469	318	860	1,390	7,830	2,530	270	90
10	....	70	406	302	1,180	1,510	7,070	2,630	262	82
11	....	81	368	310	1,510	2,730	6,130	2.830	254	75
12	....	78	326	329	1,780	3,050	4,350	2,730	240	67
13	....	88	326	329	1,930	2,630	3,870	2,260	219	59
14	....	130	342	426	1,390	1,850	4,350	2,090	205	55
15	....	107	374	530	1,330	2,010	5,090	1,740	205	52
16	....	106	437	644	1,570	2,830	5,290	1,560	206	50
17	....	106	585	730	2,260	4,530	4,890	1,450	191	46
18	....	106	465	760	2,730	2,930	4,890	1,230	178	43
19	....	105	411	790	3.050	2,170	4,890	1,090	160	40
20	71	110	386	820	3,170	1,780	4,350	1,090	152	38
21	63	114	339	955	2,730	1,570	4,530	1,170	146	37
22	65	105	334	1,050	2,260	1,780	4,890	1,670	143	36
23	62	95	322	1,130	2.010	2,350	4,890	1,930	142	36
24	68	94	318	1,180	1,850	2,630	4,710	1,930	150	37
25	70	99	326	1,230	1,710	2,090	4,190	1,330	158	41
26	70	96	334	1,050	1,570	2,350	3,570	1,050	142	48
27	67	115	350	825	1,510	4,190	3,710	790	126	50
28	64	225	398	1,050	1,930	5,490	4,190	640	116	49
29	60	297	....	1,050	1,780	5,490	4,350	540	113	48
30	59	245	....	860	1,510	5,910	4,190	490	120	46
31	61	255	....	730	....	6,590	....	440	124	....

NOTE.—Discharge, except as noted below, determined from a well-defined rating curve. Discharge Jan. 1, 2, 14–22, 27–31, Feb. 1, 2, 8–10, 15–23, 28, Mar. 3–7, 12–14, 16, 20, 21, July 15, 16, 21 and 22 estimated by comparison with records obtained at the dam site.

Monthly discharge of Tuolumne River below Hetch Hetchy dam site, near Sequoia, Cal., for the year ending Sept. 30, 1915.

Month.	Discharge in second-feet.			Run-off (total in acre-feet).	Accuracy.
	Maximum.	Minimum.	Mean.		
December 20-31	71	59	65.0	1,550	B.
January	297	57	111	6,830	B.
February	585	270	364	20,200	B.
March	1,230	302	655	40,300	B.
April	3,170	760	1,650	98,200	A.
May	6,590	1,010	2,570	158,000	A.
June	7,830	3,570	5,240	312,000	A.
July	4,350	440	1,980	122,000	A.
August	395	113	221	13,600	A.
September	153	36	72.4	4,310	B.
The period	....	....	....	777,000	

TUOLUMNE RIVER NEAR GROVELAND, CAL.

LOCATION.—In the SW. ¼ sec. 24, T. 1 S., R. 17 E., 1 mile below junction with South Fork of Tuolumne River, and about 9 miles east of Groveland, Tuolumne County.

DRAINAGE AREA.—Not measured.

RECORDS AVAILABLE.—September 2, 1907, to September 30, 1915 (not complete).

GAGE.—Gurley electric printing water-stage recorder on left bank (Pl. VI, *B*), put in operation January 2, 1913. Previously station was maintained in the pool above by the Yosemite Power Co. Gage consisted of a vertical staff on left bank at site of United States Geological Survey's present cable. November 17, 1912, the Survey began collecting records, and developed a relation between the two gages.

Discharge measurements.—Made from cable, one-third mile above gage.

Channel and control.—Boulders and solid rock; probably permanent. Banks high and not subject to overflow.

Extremes of discharge.—Maximum stage during year occurred either June 1 or 8, gage height not known; minimum stage occurred the last part of September, gage height not known.

1907–1915: Maximum stage recorded, 14.00 feet January 14, 1909 (discharge, 27,200 second-feet); minimum stage recorded, 0.70 foot October 5, 1912 (discharge, 32 second-feet). Record incomplete.

Diversions.—At Harden ranch, 7 miles above the mouth of South Fork of Tuolumne River, a small amount of water is diverted for irrigation.

Regulation.—None.

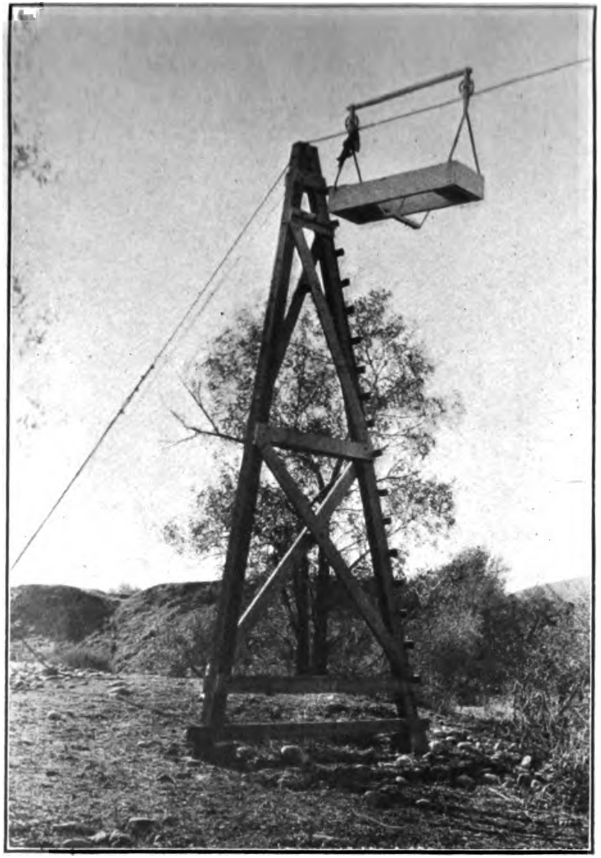
Accuracy.—Much trouble experienced with the gage this year. Monthly mean discharge for the months for which gage-height record is incomplete have been estimated by comparison with the summation of the records of flow for Tuolumne River at Hetch Hetchy dam site, Cherry Creek, Eleanor Creek, and South Fork of Tuolume River. Results excellent for periods when recorder was operating.

The following discharge measurement was made by Charles Leidl: April 22, 1915: Gage height, 7.51 feet; discharge, 5,260 second-feet.

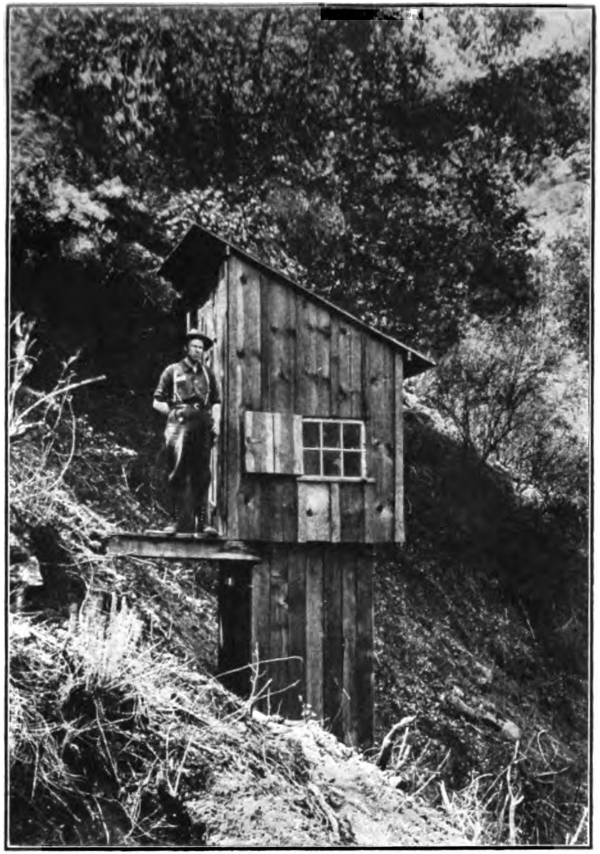
Daily discharge, in second-feet, of Tuolumne River near Groveland, Cal., for the year ending Sept. 30, 1915.

Day.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	June.	July.	Aug.	Sept.
1	110	522	114	213	....	994	2,330	....	6,320	648	171
2	108	724	98	....	....	974	2,880	....	6,750	574	179
3	102	550	110	....	....	980	3,430	....	6,530	540	183
4	95	470	175	....	....	1,010	3,290	....	6,110	512	172
5	90	410	211	....	....	980	2,740	....	5,520	473	141
6	84	360	207	....	....	950	2,330	....	3,880	401	126
7	79	325	222	....	....	896	2,170	....	3,430	355	118
8	78	295	222	....	....	872	2,070	....	3,580	335	111
9	78	265	199	....	....	878	2,170	....	4,110	327	99
10	82	240	224	....	....	850	2,810	....	4,110	319	90
11	84	217	242	....	....	884	3,650	....	4,440	311	79
12	78	201	233	....	....	908	4,440	....	4,270	303	66
13	72	187	217	....	....	932	4,960	....	3,720	296	61
14	67	177	211	....	....	1,350	3,720	....	3,290	289	58
15	63	163	203	....	....	1,970	3,500	....	2,680	282	56
16	59	159	224	....	....	2,170	4,030	....	2,170	275	54
17	58	146	250	....	....	2,330	5,140	....	2,120	268	53
18	58	143	248	....	....	2,330	6,110	....	1,870	255	53
19	83	132	238	....	....	2,500	6,750	....	1,670	235	53
20	179	128	248	....	....	2,680	6,750	....	1,620	215	53
21	452	118	233	....	1,060	2,940	5,520	....	1,620	203	52
22	358	114	226	....	994	3,220	5,330	7,190	1,870	193	52
23	310	110	224	....	1,020	3,290	4,780	7,650	2,440	179	52
24	300	100	224	....	968	3,220	4,110	7,420	2,500	163	52
25	292	99	235	....	950	2,810	4,030	6,970	1,920	150	52
26	275	96	235	....	944	2,220	3,500	5,710	1,480	150	52
27	275	94	231	....	1,190	3,430	....	5,910	1,240	149	52
28	275	94	219	....	1,110	3,500	....	6,530	1,080	148	52
29	272	111	209	....	....	2,740	....	6,530	926	147	51
30	571	129	205	....	....	2,220	....	6,750	830	155	51
31	593	....	217	....	....	2,170	....	....	742	163	....

Note.—Discharge, except as noted below, determined from a well-defined rating curve. Discharge Aug. 9–16, 27–31, Sept. 1, 18–24 and 26–30, estimated by interpolation and comparison with the summation of daily discharge of Tuolumne River at Hetch Hetchy dam site, Cherry Creek, Eleanor Creek, and South Fork of Tuolumne River.



A. CABLE SUPPORT ON STANISLAUS RIVER AT KNIGHTS FERRY, CAL.



B. TIMBER WELL AND GAGE HOUSE ON TUOLUMNE RIVER AT GROVELAND, CAL.

Monthly discharge of Tuolumne River near Groveland, Cal., for the year ending Sept. 30, 1915.

Month.	Discharge in second-feet.			Run-off (total in acre-feet).	Accuracy.
	Maximum.	Minimum.	Mean.		
October	593	58	183	11,300	A.
November	724	94	229	13,600	A.
December	250	98	211	13,000	A.
January	....	....	[a] 402	24,700	
February	....	....	[a] 1,140	63,300	
March	3,500	850	1,910	117,000	A.
April	6,750	2,070	[a] 3,940	234,000	B.
May	....	....	[a] 5,830	358,000	
June	....	5,710	[a] 8,380	499,000	
July	6,750	743	3,060	188,000	A.
August	648	147	291	17,900	B.
September	183	51	83.1	4,940	B.
The year	....	51	2,130	1,540,000	

[a] Estimated by comparison with a summation of the discharges of Tuolumne River at Hetch Hetchy dam site, Cherry Creek, Eleanor Creek, and South Fork of Tuolumne River.

TUOLUMNE RIVER ABOVE LA GRANGE DAM, NEAR LA GRANGE, CAL.

Location.—In the NE. ¼ sec. 3, T. 3 S., R. 14 E., 3½ miles above La Grange dam and 5 miles above La Grange, Stanislaus County.

Drainage area.—Not measured.

Records available.—March 19 to September 30, 1915.

Gage.—Gurley weight-driven printing water-stage recorder in reinforced concrete gage house and well on left bank.

Discharge measurements.—Made from car and cable 80 feet below the gage or by wading.

Channel and control.—Bed of channel is solid rock and boulders. Both banks high but right bank is subject to overflow at extremely high water. Control is solid rock dyke extending entirely across the stream and at low water the fall in water surface at control is about 5 feet.

Extremes of discharge.—Maximum stage during year from water-stage recorder, 20.5 feet at 7.15 a. m. May 13 (discharge, 19,500 second-feet); minimum stage recorded, 2.06 feet September 30 (discharge, 54 second-feet).

Diversions.—Yosemite Power Co.'s canal heads 9½ miles above gage and returns its water at about half a mile above the bridge at La Grange. There is also a diversion from South Fork of Tuolumne River at Harden ranch for irrigation.

Regulation.—None.

Accuracy.—Rating curve well defined; stage-discharge relation not likely to change. Results excellent for periods for which gage-height record is obtained.

This station will take the place of the one at the dam because the low-water estimates of the latter are unreliable. The one at the dam is being continued to obtain a comparison.

Discharge measurements of Tuolumne River above La Grange dam, near La Grange, Cal., during the year ending Sept. 30, 1915.

Date.	Made by—	Gage height.	Discharge.	Date.	Made by—	Gage height.	Discharge.
		Feet.	*Sec.-ft.*			*Feet.*	*Sec.-ft.*
Mar. 22	Charles Leidl	10.10	4,030	June 8	Charles Leidl	18.07	15,500
May 3	.....do	9.56	3,360	17	.....do	14.38	9,770
June 3	.....do	15.93	11,700	18	.....do	14.13	9,400
4	.....do	14.19	9,560	19	.....do	13.70	8,870
5	.....do	14.78	10,500	20	.....do	13.53	8,510
6	.....do	16.11	12,400	30	H. J. Tompkins	13.17	8,090
6	.....do	15.70	12,200	July 1	.....do	12.61	6,930
7	.....do	17.45	15,000	Aug. 26	Charles Leidl	3.12	205
7	.....do	16.92	13,500	Sept. 30	.....do	2.06	52

Daily discharge, in second-feet, of Tuolumne River above La Grange dam, near La Grange, Cal., for the year ending Sept. 30, 1915.

Day.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.
1		3,060	4,330	14,600	6,820		159
2		3,330	3,600	13,800	6,820		159
3		4,110	3,240	11,500	6,820		172
4		4,670	3,240	9,360	6,400		175
5		4,110	3,700	9,510	5,700		170
6		3,420	3,600	11,000	3,800		170
7		3,060	3,900	12,700	3,420		150
8		3,060	4,440	13,800	3,510		145
9		3,060	4,440	14,300	4,000		
10		3,700	5,040	12,900	4,110		
11		4,670	7,260	12,100	4,440		
12		5,700	10,400	9,360	4,220		
13		6,260	14,900	7,710	3,700		
14		5,170	8,910	7,710	3,240		
15		4,670	7,110	8,910	2,610		
16		5,040	8,010	9,360	2,280		
17		6,260	12,100	9,210	2,060		
18		7,560	11,600	8,910	1,780		
19	3,150	8,310	8,460	8,310	1,630		
20	3,240	8,760	6,820	7,560	1,570		
21	3,420	8,010	5,700	7,710	1,540		
22	3,700	7,260	5,700	8,160	1,920		
23	4,000	6,400	6,540	8,010	2,360		
24	4,440	5,430	8,010	7,710	2,360		
25	4,330	5,040	7,560	6,960	1,780	193	
26	4,000	4,550	6,820	5,980	1,430	203	
27	3,240	4,330	9,360	6,400	1,360	194	
28	4,550	5,040	12,300	6,960	1,330	178	
29	5,840	5,300	12,000	7,260		165	
30	4,220	5,300	11,800	6,820		150	54
31	3,330		12,600			146	

NOTE.—Discharge determined from a well-defined rating curve. July 29 to Aug. 24 well was silted up; Sept. 9–30 stage was below bottom of well.

Monthly discharge of Tuolumne River above La Grange dam, near La Grange, Cal., for the year ending Sept. 30, 1915.

Month.	Discharge in second-feet.			Run-off (total in acre-feet).	Accuracy.
	Maximum.	Minimum.	Mean.		
Mar. 19–31	5,840	3,150	3,960	102,000	A.
April	8,760	3,060	5,150	306,000	A.
May	14,900	3,240	7,530	463,000	A.
June	14,600	5,980	9,490	565,000	A.
July 1–28	6,820	1,330	3,320	184,000	A.
The period				1,620,000	

Combined daily discharge, in second-feet, of Tuolumne River above La Grange dam and Yosemite Power Co.'s canal, near La Grange, Cal., for the year ending Sept. 30, 1915.

Day.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.
1	....	3,120	4,390	14,700	6,880	....	221
2	....	3,390	3,660	13,900	6,880	....	221
3	....	4,170	3,300	11,600	6,880	....	234
4	....	4,730	3,300	9,430	6,460	....	237
5	....	4,170	3,760	9,580	5,760	....	232
6	....	3,470	3,660	11,100	3,860	....	232
7	....	3,120	3,960	12,800	3,480	....	212
8	....	3,120	4,500	13,900	3,570	....	207
9	....	3,120	4,500	14,300	4,060	....	....
10	....	3,710	5,100	13,000	4,170	....	....
11	....	4,730	7,320	12,200	4,500	....	....
12	....	5,760	10,500	9,420	4,280	....	....
13	....	6,320	15,000	7,770	3,760	....	....
14	....	5,230	8,970	7,770	3,300	....	....
15	....	4,730	7,170	8,970	2,670	....	....
16	....	5,100	8,070	9,420	2,340	....	....
17	....	6,320	12,200	9,270	2,120	....	....
18	....	7,560	11,700	8,970	1,840	....	....
19	3,210	8,310	8,520	8,370	1,690	....	....
20	3,300	8,820	6,880	7,620	1,630	....	....
21	3,480	8,070	5,760	7,770	1,600	....	....
22	3,760	7,320	5,760	8,220	1,980	....	....
23	4,060	6,460	6,600	8,070	2,390	....	....
24	4,500	5,490	8,070	7,770	2,420	....	....
25	4,390	5,100	7,620	7,020	1,840	265	....
26	4,060	4,550	6,880	6,040	1,490	265	....
27	3,300	4,390	9,420	6,460	1,420	256	....
28	4,610	5,100	12,400	7,020	1,390	240	....
29	5,880	5,360	12,100	7,320	....	227	....
30	4,280	5,360	11,900	6,880	....	212	113
31	3,390	....	12,700	....	....	208	....

NOTE.—See page 182 for daily-discharge table for Yosemite Power Co.'s canal.

Combined monthly discharge of Tuolumne River above La Grange dam and Yosemite Power Co.'s canal, near La Grange, Cal., for the year ending Sept. 30, 1915.

Month.	Discharge in second-feet.			Run-off (total in acre-feet).
	Maximum.	Minimum.	Mean.	
March 19-31	5,880	3,210	4,020	104,000
April	8,820	3,120	5,210	310,000
May	15,000	3,300	7,600	467,000
June	14,700	6,040	9,560	569,000
July 1-28	6,880	1,390	3,380	188,000
The period				1,640,000

NOTE.—See page 182 for monthly discharge table for Yosemite Power Co.'s canal.

TUOLUMNE RIVER AT LA GRANGE DAM, NEAR LA GRANGE, CAL.

LOCATION.—In the NE. ¼ SE. ¼ sec. 17, T. 3 S., R. 14 E., at La Grange dam, about 1½ miles northeast of La Grange, Stanislaus County.

DRAINAGE AREA.—1,500 square miles.

RECORDS AVAILABLE.—August 30, 1895 to September 30, 1915.

GAGE.—Painted on rock ledge on right bank 80 feet above dam; read twice a day by F. A. Townsend. Zero of gage is at average elevation of crest of dam. Until March 31, 1908, the station was located at the wagon bridge at La Grange.

DISCHARGE.—Computed by use of weir formula from gage heights showing depth of water on creast of curved masonry diversion dam. Coefficient was determined from current meter measurements made at highway bridge at La Grange, corrected to give discharge at dam. To obtain the total flow of Tuolumne River above La Grange dam it is necessary to combine the flow over the dam with the discharge of Modesto, Turlock, and Yosemite Power Co.'s canals.

Channels and control.—River bed composed of gravel and boulders. Dam is a permanent control.

Extremes of discharge.—Maximum stage recorded during year, 7.1 feet, May 13 (discharge, 17,200 second-feet); there was no flow over dam during most of October, November, December, August and September.

1907–1915: Maximum stage recorded, 16.45 feet, on the morning of January 31, 1911; crest of flood from high-water mark on gage (discharge, 60,300 second-feet); there was no flow over dam for long periods each year.

Diversions.—Modesto and Turlock canals divert at dam. Yosemite Power Co.'s canal heads 13 miles above the dam and returns its water below the dam, about half a mile above the bridge at La Grange. There is also a diversion from South Fork of Tuolumne River at Harden ranch, for irrigation.

Regulation.—At low water, the small amount of storage behind La Grange dam affects the flow.

Accuracy.—Results good except at extremely low water. The combined flow of river and canals is affected by seepage through dam and from canals, by the use of flashboards on the dam for a short period during the low-water flow, by the small amount of water that is occasionally spilled from canals at the waste gates above the gaging stations, and by the water discharged through the ports and sand gates in the dam during certain periods of the year.

The following discharge measurement was made by Charles Leidl: March 21, 1915, gage height, 2.20 feet; discharge, 3,050 second-feet.

Daily discharge, in second-feet, of Tuolumne River over dam near La Grange, Cal., for the year ending Sept. 30, 1915.

Day.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.
1	....	274	....	229	5,180	2,560	1,500	2,370	13,300	4,470
2	....	229	....	229	6,180	2,090	1,660	1,830	12,300	4,940
3	....	320	....	213	4,700	1,740	2,370	1,420	10,100	4,700
4	....	115	....	421	2,460	1,500	2,950	1,580	7,800	4,470
5	....	29	....	421	2,000	1,340	2,460	1,830	8,360	3,580
6	....	....	....	530	1,740	1,180	1,830	1,660	9,810	2,370
7	....	....	....	421	1,500	1,040	1,580	2,000	11,700	1,420
8	....	....	....	476	2,180	905	1,740	2,460	12,300	1,420
9	....	....	....	747	9,810	710	1,660	2,280	12,700	1,500
10	....	....	....	589	5,670	589	2,180	2,950	11,700	1,740
11	....	....	....	530	5,180	370	3,370	4,700	10,400	2,000
12	....	....	....	589	3,370	149	4,470	7,800	7,240	2,280
13	....	....	....	530	2,090	81	4,700	13,300	5,670	1,660
14	....	....	....	2,460	1,580	240	4,020	7,240	5,670	1,260
15	....	....	....	1,110	1,500	476	3,370	5,180	6,970	772
16	....	....	....	648	1,500	905	3,800	6,180	7,520	1,660
17	....	....	....	530	3,800	1,260	4,940	9,510	6,970	910
18	....	....	....	530	3,370	1,580	6,180	10,100	6,440	750
19	....	....	....	530	2,950	1,580	7,240	6,970	6,440	0
20	....	....	....	421	4,940	1,660	7,520	5,180	5,920	0
21	....	....	....	421	3,580	2,750	6,180	4,240	5,420	0
22	....	....	213	421	2,950	2,950	5,670	4,240	5,920	0
23	....	....	229	443	2,560	2,560	5,180	4,940	6,180	30
24	....	....	213	421	2,280	2,560	4,020	6,180	5,920	70
25	....	....	229	530	2,280	2,460	3,580	5,670	5,420	60
26	....	....	213	530	2,000	2,090	2,950	5,180	4,240	0
27	....	....	165	589	1,830	1,740	2,560	8,080	3,800	0
28	....	....	165	2,950	3,800	2,750	3,160	11,400	4,470	0
29	....	....	149	2,950	....	4,240	3,370	10,700	5,180	0
30	....	....	189	2,560	....	2,460	3,800	10,700	5,180	0
31	229	....	229	1,920	....	1,660	....	11,400	....	0

Note.—Discharge determined from a rating curve developed from current meter discharge measurements and from the weir formula $Q=905h^{3/2}$. Flashboards on dam July 17, 18, and 23–25; discharge estimated. No flow over dam, Oct. 1–30, Nov. 6 to Dec. 21; July 19–22, and July 26 to Sept. 30.

Monthly discharge of Tuolumne River over dam near La Grange, Cal., for the year ending Sept. 30, 1915.

Month.	Discharge in second-feet.			Run-off (total in acre-feet).	Accuracy.
	Maximum.	Minimum.	Mean.		
October	229	0	7.4	455	
November	320	0	32.2	1,920	D.
December	229	0	64.3	3,950	C.
January	2,950	213	835	51,300	B.
February	9,810	1,500	3,320	184,000	A.
March	4,240	81	1,620	99,600	A.
April	7,520	1,500	3,670	218,000	A.
May	13,300	1,420	5,780	355,000	A.
June	13,300	3,800	7,700	458,000	A.
July	4,940	0	1,360	83,600	B.
August	0	0	0	0	
September	0	0	0	0	
The year	13,300	0	2,010	1,460,000	

Combined daily discharge, in second-feet, of Tuolumne River and three canals near La Grange, Cal., for the year ending Sept. 30, 1915.

Day.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.
1	176	336	62	291	5,270	2,980	3,160	4,400	14,800	6,790	635	192
2	170	291	62	295	6,260	2,530	3,320	3,930	13,900	7,300	689	194
3	164	382	62	311	4,770	2,320	4,020	3,670	11,700	7,040	644	197
4	158	177	62	484	2,550	2,260	4,470	3,830	9,430	6,850	625	197
5	132	91	53	480	2,100	2,160	3,980	4,080	9,150	5,920	595	104
6	136	62	56	589	1,840	2,060	3,460	3,910	11,400	4,730	571	104
7	123	62	5	480	1,670	2,000	3,130	4,230	13,100	3,810	537	104
8	115	62	59	538	2,350	1,860	3,180	4,690	14,200	3,810	517	104
9	115	0	62	791	9,860	1,800	3,060	4,490	14,700	3,880	495	95
10	119	18	56	603	5,720	1,720	3,500	5,160	12,800	4,150	449	98
11	62	62	62	592	5,210	1,600	4,500	6,890	12,100	4,410	391	88
12	62	62	59	667	3,420	1,560	5,600	9,850	9,420	4,680	415	92
13	0	62	62	634	2,250	1,620	5,810	15,300	7,940	4,070	393	92
14	47	62	62	2,560	2,080	1,780	5,050	9,250	7,980	3,680	388	92
15	62	62	2	1,210	1,900	2,010	4,500	7,210	9,260	3,190	354	62
16	0	62	62	688	2,260	2,370	4,930	8,190	9,790	2,740	342	0
17	62	62	62	592	4,620	2,730	6,150	11,400	9,220	2,540	345	59
18	62	62	62	634	4,220	3,050	7,350	11,600	8,650	2,340	330	59
19	62	62	62	634	3,400	3,110	8,450	8,450	8,760	2,140	306	64
20	62	62	62	525	5,220	3,260	8,860	6,840	8,240	2,050	287	33
21	62	62	62	525	3,870	4,060	7,460	6,040	7,750	1,940	269	48
22	62	62	275	518	3,250	4,260	7,020	6,040	8,240	2,230	255	92
23	62	62	291	505	2,860	3,800	6,580	6,740	8,450	2,270	245	92
24	62	62	275	483	2,580	4,370	5,430	7,840	8,190	2,410	244	88
25	62	62	293	605	2,580	4,420	5,040	7,180	7,730	2,410	237	88
26	62	63	279	631	2,400	3,770	4,450	6,680	6,540	2,000	245	88
27	62	64	227	693	2,230	3,390	4,150	9,560	6,110	1,790	245	92
28	62	62	227	3,040	4,230	4,380	5,110	12,900	6,780	1,270	223	92
29	62	62	211	3,030	....	5,700	5,320	12,200	7,490	1,020	212	91
30	62	62	251	2,640	....	4,070	5,810	12,200	7,490	933	192	87
31	291	....	291	2,000	....	3,390	....	12,900	....	837	191	....

NOTE.—Amount of water discharged through ports in dam and spillways of canals unknown and not included in record. Turlock canal spilled water Oct. 10, 11, 22, and 23, and Dec. 5–22. Both ports open Oct. 12, 13, 15–31, Nov. 1–25, 28–30, Dec. 1–22. One port open Sept. 4–15. Both ports open Sept. 16–18 and 30. See p. 184 for daily discharge table of Modesto canal, p. 185 for that of Turlock canal, and p. 182 for that of Yosemite Power Co.'s canal.

Combined monthly discharge of Tuolumne River and three canals near La Grange, Cal., for the year ending Sept. 30, 1915.

[Drainage area, 1,500 square miles.]

Month.	Discharge in second-feet.				Run-off.	
	Maximum.	Minimum.	Mean.	Per square mile.	Depth in inches on drainage area.	Total in acre-feet.
October	291	0	90.3	0.060	0.07	5,550
November	382	0	90.8	.061	.07	5,400
December	293	2	122	.081	.09	7,500
January	3,040	291	912	.608	.70	56,100
February	9,860	1,670	3,610	2.41	2.51	200,000
March	5,700	1,560	2,920	1.95	2.25	180,000
April	8,860	3,060	5,100	3.40	3.79	303,000
May	15,300	3,670	7,670	5.11	5.89	472,000
June	14,800	6,110	9,710	6.47	7.22	578,000
July	7,300	837	3,390	2.26	2.61	208,000
August	689	191	383	.255	.29	23,600
September	197	0	96.3	.064	.07	5,730
The year	15,300	0	2,820	1.88	25.56	2,040,000

NOTE.—See p. 184 for monthly discharge table of Modesto canal, p. 186 for that of Turlock canal, and p. 183 for that of Yosemite Power Co.'s canal.

CHERRY CREEK NEAR SEQUOIA, CAL.

LOCATION.—In the SW. ¼ sec. 28, T. 2 N., R. 19 E., in Stanislaus National Forest, at abandoned sawmill camp, 3 miles by trail from Lake Eleanor, and about 13 miles north of Sequoia, Tuolumne County.

DRAINAGE AREA.—114 square miles[1] (above dam site in sec. 5, T. 1 N., R. 19 E.).

RECORDS AVAILABLE.—April 1, 1910, to September 30, 1915.

GAGE.—Gurley printing water-stage recorder on right bank 800 feet above site of old suspension bridge. Original gage was a Lietz graph water-stage recorder at the bridge. It was moved upstream to present site (new datum) October 22, 1913, and replaced by the present gage (same datum) November, 30, 1914.

DISCHARGE MEASUREMENTS.—Made from bridge or by wading. Bridge collapsed shortly before March 24, 1915. On this date a cable and car was installed 10 feet upstream from bridge site.

CHANNEL AND CONTROL.—Channel is fine gravel and sand which shifts slightly, but control is a solid rock dike except at right bank, where it is gravel and small boulders. Point of zero flow is at gage height 0.4 foot.

EXTREMES OF DISCHARGE.—Maximum stage during year from water-stage recorder, 8.55 feet at 9.30 p. m. June 8 (discharge, determined from extension of rating curve, 3,990 second-feet); minimum stage from water-stage recorder, 0.86 foot, September 26 to 30 (discharge, 1.5 second-feet).

1910–1915: Maximum mean daily discharge, 7,000 second-feet January 30, 1911 (maximum stage unknown); no flow September 6 to 12, 1910.

WINTER FLOW.—Stream freezes over at gage but not at control. No effect of ice upon the stage-discharge relation has been detected.

DIVERSIONS.—None.

REGULATION.—None.

ACCURACY.—Results excellent.

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[1] Freeman, J. R., The Hetch Hetchy water supply for San Francisco, p. 24, 1912.

Discharge measurements of Cherry Creek near Sequoia, Cal., during the year ending Sept. 30, 1915.

Date.	Made by—	Gage height.	Discharge.	Date.	Made by—	Gage height.	Discharge.
		Feet.	*Sec.-ft.*			*Feet.*	*Sec.-ft.*
Nov. 30	Lasley Lee	1.49	24	May 24	C. P. Firestone	5.06	1,280
Dec. 13	.....do	2.08	83	27	.....do	5.65	1,590
15	.....do	2.02	75	29	.....do	5.91	1,710
Jan. 15	.....do	2.14	99	June 25	Lasley Lee	4.79	1,170
24	.....do	1.94	66	25	.....do	4.72	1,110
Mar. 27	.....do	3.07	387	Aug. 13	.....do	1.49	25
Apr. 18	.....do	4.97	1,190	Sept. 12	.....do	.91	2.6
May 16	C. P. Firestone	4.36	884	28	C. J. Emerson	.86	1.1
21	.....do	3.43	503				

Daily discharge, in second-feet, of Cherry Creek near Sequoia, Cal., for the year ending Sept. 30, 1915.

Day.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.
1	6.7	191	20	54	258	123	406	501	2,660	1,360	64	4.3
2	6.4	252	20	67	197	115	528	394	2,250	1,380	56	4.3
3	6.1	164	30	81	110	120	716	340	1,750	1,300	51	4.0
4	5.5	126	44	81	115	136	695	406	1,620	1,200	48	3.6
5	5.2	99	59	72	128	147	512	413	1,960	1,000	44	3.4
6	4.6	81	69	66	139	142	402	512	2,410	758	41	3.2
7	4.0	69	75	63	131	128	406	612	2,660	653	39	3.0
8	5.5	59	66	67	139	126	376	695	2,840	695	37	2.8
9	17	50	67	63	133	131	512	780	2,660	780	34	2.6
10	11	44	69	69	123	123	695	982	2,410	802	32	2.4
11	7.0	40	69	70	123	147	868	1,560	2,020	846	29	2.2
12	5.8	36	75	60	120	153	982	1,360	1,470	802	27	2.2
13	4.6	34	83	77	126	173	982	1,200	1,250	716	25	2.0
14	4.0	31	72	123	139	236	737	716	1,620	632	23	2.8
15	3.8	29	67	77	136	306	824	846	1,880	497	22	2.4
16	3.4	26	60	77	216	369	1,050	1,280	1,880	425	20	2.2
17	3.4	24	62	77	268	428	1,300	1,880	1,680	376	18	2.0
18	37	22	67	79	188	455	1,560	1,030	1,680	319	18	2.0
19	22	20	69	84	161	489	1,620	780	1,620	278	16	1.9
20	191	18	64	86	139	512	1,500	632	1,410	261	15	1.8
21	110	17	62	81	144	572	1,300	612	1,470	255	13	1.8
22	103	16	56	70	118	632	1,080	824	1,620	258	12	1.8
23	103	15	64	64	115	695	890	1,030	1,620	278	11	1.8
24	101	15	69	64	113	716	758	1,330	1,470	362	9.8	1.6
25	79	14	66	69	118	674	737	890	1,300	302	9.0	1.6
26	69	13	63	64	131	552	653	1,200	1,120	223	7.8	1.5
27	66	13	56	120	142	440	824	1,880	1,220	167	7.4	1.5
28	63	24	52	176	153	824	1,030	2,410	1,380	131	6.4	1.5
29	139	33	52	239	....	504	868	2,180	1,470	106	6.1	1.5
30	421	24	59	142	....	366	674	2,180	1,360	88	5.5	1.5
31	204	....	60	144	....	333	....	2,490	....	75	5.2	....

NOTE.—Discharge determined from a well-defined rating curve.

Monthly discharge of Cherry Creek near Sequoia, Cal., for the year ending Sept. 30, 1915.

Month.	Discharge in second-feet.			Run-off (total in acre-feet).	Accuracy.
	Maximum.	Minimum.	Mean.		
October	421	3.4	58.5	3,600	A.
November	252	13	53.3	3,170	A.
December	83	20	60.2	3,700	A.
January	239	54	87.9	5,400	A.
February	268	110	147	8,160	A.
March	824	115	351	21,600	A.
April	1,620	376	850	50,600	A.
May	2,490	340	1,100	67,600	A.
June	2,840	1,120	1,790	107,000	A.
July	1,380	75	559	34,400	A.
August	6.4	5.2	24.3	1,490	A.
September	4.3	1.5	2.37	141	C.
The year	2,840	1.5	423	307,000	

ELEANOR CREEK NEAR SEQUOIA, CAL.

LOCATION.—In the SW. ¼ SE. ¼ sec. 34, T. 2 N., R. 19 E., in Yosemite National Park, 500 feet above trail bridge, half a mile below Lake Eleanor, about 12 miles north of Sequoia, Tuolumne County, and 26 miles by trail from Hamiltons Station.

DRAINAGE AREA.—79 square miles [1] (above dam site in sec. 3, T. 1 N., R. 19 E.).

RECORDS AVAILABLE.—November 20, 1909, to September 30, 1915.

GAGE.—Lietz water-stage recorder on right bank with a vertical staff in two sections a short distance upstream. Original gage was probably the staff gage.

DISCHARGE MEASUREMENTS.—Made from car and cable 90 feet above gage or by wading.

CHANNEL AND CONTROL.—Bed of channel composed of small boulders. Control is fairly permanent. Point of zero flow is at gage height 0.8 foot. Banks fairly high and probably not subject to overflow.

EXTREMES OF DISCHARGE.—Maximum stage during year from water-stage recorder, 7.85 feet at 3.30 a. m. May 13 (discharge, 1,540 second-feet); minimum stage, 0.94 foot from 4 to 6 p. m. September 30 (discharge, 0.7 second-foot).

1910–1915: Maximum stage recorded, 13.1 feet January 30, 1911 (discharge, 5,000 second-feet); no flow September 8 to 14, 1910.

WINTER FLOW.—Stage-discharge relation not affected by ice.

DIVERSIONS.—None.

REGULATION.— Natural regulation by Lake Eleanor reduces the fluctuations in stage.

ACCURACY.—Results excellent.

Discharge measurements of Eleanor Creek near Sequoia, Cal., during the year ending Sept. 30, 1915.

Date.	Made by—	Gage height.	Discharge.	Date.	Made by—	Gage height.	Discharge.
		Feet.	*Sec.-ft.*			*Feet.*	*Sec.-ft.*
Oct. 2	Lasley Lee	1.14	2.1	May 13	Lasley Lee	7.49	1,380
Nov. 30	.....do	1.43	12	13	.....do	7.40	1,330
Dec. 16	.....do	1.88	41	14	.....do	6.23	934
Jan. 1	.....do	1.93	41	14	.....do	6.04	891
12	.....do	2.10	55	15	.....do	5.50	736
15	.....do	2.32	74	17	.....do	7.66	1,460
25	.....do	2.22	64	25	C. P. Firestone	6.52	1,090
Feb. 5	.....do	2.99	153	25	Lasley Lee	6.45	1,020
Mar. 24	.....do	4.98	578	July 8	.....do	3.43	227
Apr. 17	.....do	5.89	860	Aug. 14	.....do	1.55	17
May 12	.....do	7.01	1,220	Sept. 13	.....do	1.11	1.1
13	.....do	7.66	1,480	29	C. P. Firestone	.99	.4

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[1] Freeman, J. R., The Hetch Hetchy water supply for San Francisco, p. 24, 1912.

Daily discharge, in second-feet, of Eleanor Creek near Sequoia, Cal., for the year ending Sept. 30, 1915.

Day.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.
1	2.5	49	12	40	168	134	313	464	1,300	392	47	4.5
2	2.5	59	13	40	202	130	346	380	1,220	404	43	4
3	2.5	76	14	42	198	123	464	313	1,050	404	38	4
4	2.5	80	16	44	173	120	568	302	890	392	35	3.5
5	2	77	17	47	154	120	516	313	860	357	33	3.5
6	2	68	18	49	141	119	471	324	954	302	30	3
7	2	59	20	50	130	119	426	380	1,020	260	27	3
8	2	51	21	50	132	119	380	440	1,080	226	25	3
9	2	45	23	51	151	118	335	477	1,120	215	24	2.5
10	2	40	27	51	152	117	428	582	1,020	213	22	2.5
11	2	37	30	51	145	117	568	922	922	215	21	2.5
12	2	33	32	53	138	117	725	1,260	770	222	20	2.5
13	2	29	34	56	128	124	830	1,400	624	220	18	2
14	2	27	36	67	122	145	680	954	582	206	18	2
15	1.5	25	37	72	119	178	596	725	624	186	16	2
16	1.5	22	38	72	127	224	666	830	652	166	15	1.5
17	1.5	21	40	71	168	280	860	1,330	624	146	14	1.5
18	1.5	19	42	70	179	346	986	1,160	596	132	12	1.5
19	1.5	18	42	69	171	404	1,080	800	568	116	12	1.5
20	3	18	42	68	163	428	1,050	624	516	102	11	1.5
21	7	17	42	66	152	452	954	529	477	96	10	1.5
22	10	16	42	64	142	503	890	529	477	90	10	1.5
23	14	16	42	63	133	555	740	638	477	88	9	1
24	18	15	42	61	124	596	610	1,120	464	87	8.5	1
25	20	14	42	62	118	596	529	1,050	440	87	7.5	1
26	22	14	42	63	117	542	464	890	404	86	7	1
27	24	14	42	67	117	440	440	1,080	380	80	7	1
28	24	13	42	89	127	503	529	1,360	380	72	7	1
29	25	12	42	110	....	568	596	1,330	404	65	5.5	1
30	33	12	42	132	....	452	582	1,220	416	59	5.5	1
31	49	....	41	134	....	346	....	1,220	....	53	5	....

NOTE.—Discharge determined from a well-defined rating curve. Discharge interpolated Jan. 20-22, 28, and 29; Feb. 11 and 23; Apr. 6-8 and Aug. 4 and 5.

Monthly discharge of Eleanor Creek near Sequoia, Cal., for the year ending Sept. 30, 1915.

Month.	Discharge in second-feet.			Run-off (total in acre-feet).	Accuracy.
	Maximum.	Minimum.	Mean.		
October	49	1.5	9.24	568	A.
November	80	12	33.2	1,980	A.
December	42	12	32.7	2,010	A.
January	134	40	65.3	4,020	A.
February	202	117	146	8,110	A.
March	596	117	295	18,100	A.
April	1,080	313	621	37,000	A.
May	1,400	302	805	49,500	A.
June	1,300	380	710	42,200	A.
July	404	53	185	11,400	A.
August	47	5.0	18.2	1,120	A.
September	4.5	1.0	2.10	125	B.
The year	1,400	1.0	243	176,000	

EVAPORATION FROM LAKE ELEANOR NEAR SEQUOIA, CAL.

LOCATION.—In sec. 35, T. 2 N., R. 19 E., in Yosemite National Park, about 12 miles north of Sequoia, Tuolumne County.

RECORDS AVAILABLE.—February 27 to September 30, 1915.

EQUIPMENT.—Evaporation pan is 48 inches in diameter, 10 inches deep, hung by four turnbuckles in a raft of cedar logs. Raft is anchored about 1,000 feet from the nearest shore.

Method.—A field engineer makes observations several times a week by measuring the amount of water he adds to or takes out of the volume in the pan in order to bring the water surface in the pan to the point of a metal cone set at its center. The water added or taken out is measured in a small can, the cubical content of which is known. Number of cans is reduced to depth in inches and that, corrected by the amount of precipitation, gives amount of evaporation.

Elevation.—About 4,700 feet above sea level.

Total evaporation in inches, since last day recorded, of Lake Eleanor near Sequoia, Cal., for the year ending Sept. 30, 1915.

Day.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.
1			0.09		0.07		0.25	
2				0.11				
3							.56	0.71
4		0.52				0.64		
5			.31	.18	1.77		.59	
6								
7		[a].27				.46		
8				.18	.30			1.49
9			.36				.80	
10		.21		.12	.38	.46		.39
11							.51	
12		.10	.23			.31		
13				[a].19	.33		.71	.82
14		.25				.36		
15			.25				.34	
16				.16	.36	.38		
17								.89
18		.21			.49			
19			.36			.74	1.10	.38
20				.27	.25			
21		.23				.54		.41
22							.89	
23						.43		
24		.25			.79			.93
25							.51	
26	0.00					.92		
27					.33		.54	
28	.26		[a].72					.69
29		.51				.98		
30			.11		.48			.41
31		.18		.75		.50	1.03	
Total for month		2.73	2.43	1.96	5.55	6.72	7.83	7.12

[a] Estimated.

JAWBONE CREEK NEAR TUOLUMNE, CAL.

Location.—In the NE. ¼ sec. 33, T. 1 N., R. 18 E., at Jawbone ranger station, in Stanislaus National Forest, 1 mile above junction with Tuolumne River, 14 miles southeast of Tuolumne, Tuolumne County, and 12 miles northeast of Groveland.

Drainage area.—Not measured.

Records available.—September 13, 1910, to September 29, 1915 (fragmentary), when the station was discontinued.

Gage.—Vertical staff in two sections fastened to an alder tree on right bank 100 feet below trail crossing; read once a day occasionally, by G. L. Adams.

Discharge measurements.—Made from footbridge about 1,000 feet below gage or by wading.

Channel and control.—Gravel and boulders; shift during high water.

Extremes of stage.—Maximum stage recorded during year, 0.71 foot April 16; minimum stage recorded, −1.40 feet September 21.

1910–1915: Maximum stage recorded, 3.72 feet January 30, 1911; minimum stage recorded, −1.40 feet September 21, 1915 (record incomplete).

Winter flow.—Stage-discharge relation possibly affected by ice.

Diversions.—Small irrigation ditch at ranger's station above the gage.

Regulation.—None.

Cooperation.—Gage-height record furnished by United States Forest Service.

Data inadequate for determination of discharge.

Discharge measurements of Jawbone Creek near Tuolumne, Cal., during the year ending Sept. 30, 1915.

[Made by Lasley Lee.]

Date.	Gage height.	Discharge.
	Feet.	*Sec.-ft.*
Apr. 5	0.58	54
16	.71	66

Daily gage height, in feet, of Jawbone Creek near Tuolumne, Cal., for the year ending Sept. 30, 1915.

Day.	Apr.	July.	Aug.	Sept.	Day.	Apr.	July.	Aug.	Sept.
1					16	0.71			
2					17		−1.15		
3					18			−1.33	
4			−1.26	−1.37	19		−1.20		
5	0.58				20				
6					21				−1.40
7			−1.30	−1.38	22		−1.22		
8					23				
9		−1.08			24			−1.33	
10			−1.30	−1.38	25				
11					26		−1.25	−1.35	−1.38
12		−1.12		−1.38	27				
13		−1.12			28				
14			−1.30		29				−1.38
15		−1.15		−1.38	30			−1.36	
					31		−1.25		

SOUTH FORK OF TUOLUMNE RIVER NEAR SEQUOIA, CAL.

Location.—In the NW. ¼ sec. 31, T. 1 S., R. 19 E., at highway bridge at sawmill 600 feet above Hazel Green Creek, 1 mile above intake of Golden Rock ditch, and 3 miles west of Sequoia, Tuolumne County.

Drainage area.—Not measured.

Records available.—January 11, 1914, to September 30, 1915.

Gage.—Vertical staff fastened to downstream end of right abutment of bridge; read twice a day by J. J. Scofield.

Discharge measurements.—Made from highway bridge or by wading.

Channel and control.—Gravel and boulders; apt to shift during high water Both banks are high, but right bank may be overflowed at extremely high water.

Extremes of discharge.—Maximum stage recorded during year, 4.5 feet at 7 a. m. May 13 (discharge, 980 second-feet); minimum stage recorded, 1.20 feet October 1 to 19 (discharge, 8.7 second-feet).

1914–15: Maximum stage recorded, 8.0 feet at 7 a. m. and 5 p. m. January 25, 1914 (discharge, 3,510 second-feet, determined from extension of rating curve and may be subject to error); minimum state recorded, 1.20 feet August 17 to September 18 and September 20 to October 19, 1914 (discharge, 8.7 second-feet).

Winter flow.—Stage-discharge relation not affected by ice.

Diversions.—None above the station.

Regulation.—None.

Accuracy.—Results good.

Cooperation.—Gage-height record furnished by Yosemite Power Co., through H. A. Kluegel, chief engineer.

Discharge measurements of South Fork of Tuolumne River near Sequoia, Cal., during the year ending Sept. 30, 1915.

Date.	Made by—	Gage height.	Discharge.	Date.	Made by—	Gage height.	Discharge.
		Feet.	*Sec.-ft.*			*Feet.*	*Sec.-ft.*
Apr. 21	Charles Leidl	2.99	289	July 28	H. D. McGlashan	1.56	31
July 3	H. J. Tompkins	2.00	74				

Daily discharge, in second-feet, of South Fork of Tuolumne River near Sequoia, Cal., for the year ending Sept. 30, 1915.

Day.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.
1	8.7	13	10	15	118	76	171	194	491	89	26	13
2	8.7	14	11	15	182	69	182	160	470	92	26	13
3	8.7	13	17	16	74	69	182	171	392	82	26	13
4	8.7	13	19	18	57	74	194	194	339	74	26	13
5	8.7	12	18	19	52	69	171	206	356	66	26	13
6	8.7	11	14	19	49	66	148	194	430	64	26	13
7	8.7	11	16	16	44	75	148	206	450	64	26	13
8	8.7	10	11	17	98	75	142	232	450	64	20	13
9	8.7	10	13	23	144	77	144	246	392	62	20	13
10	8.7	10	18	18	112	71	171	232	339	58	19	13
11	8.7	9.6	16	19	89	69	194	322	246	55	19	13
12	8.7	9.6	13	19	63	70	219	322	260	53	19	13
13	8.7	9.6	18	18	55	71	206	920	206	52	19	13
14	8.7	9.6	13	66	54	86	194	512	232	49	19	13
15	8.7	9.6	13	32	54	101	182	430	232	45	19	13
16	8.7	9.6	19	22	118	114	206	450	219	43	19	13
17	8.7	9.6	19	22	232	130	246	804	182	43	19	13
18	8.7	9.6	16	22	144	132	260	603	182	43	19	13
19	8.7	9.6	16	22	106	136	290	470	171	41	15	10
20	26	9.6	18	20	98	144	290	374	160	39	15	10
21	22	9.6	16	19	79	144	306	339	156	38	15	10
22	12	9.6	18	18	75	156	260	322	150	35	16	10
23	10	9.6	18	18	71	160	246	339	144	34	16	10
24	9.6	9.6	17	17	69	160	206	491	130	34	16	10
25	11	9.6	17	20	70	156	206	411	121	32	16	13
26	11	9.6	17	18	70	150	194	430	112	30	16	13
27	10	9.6	16	33	71	129	182	580	107	30	16	13
28	9.6	13	16	82	86	374	194	557	101	30	16	13
29	9.6	13	15	160	......	290	232	450	96	30	13	13
30	18	10	15	76	......	206	219	470	92	30	13	13
31	14	......	15	62	......	182	......	512	......	30	13	......

Note.—Discharge determined from a rating curve well defined below 400 second-feet.

Monthly discharge of South Fork of Tuolumne River near Sequoia, Cal., for the year ending Sept. 30, 1915.

Month.	Discharge in second-feet.			Run-off (total in acre-feet).	Accuracy.
	Maximum.	Minimum.	Mean.		
October	26	8.7	10.6	652	B.
November	14	9.6	10.5	625	B.
December	19	10	15.7	965	A.
January	160	15	31.0	1,910	A.
February	232	44	90.5	5,030	A.
March	374	66	125	7,690	A.
April	306	142	206	12,300	A.
May	920	160	392	24,100	B.
June	491	92	247	14,700	A.
July	92	30	49.4	3,040	A.
August	26	13	19.0	1,170	A.
September	13	10	12.4	738	B.
The year	920	8.7	101	72,900	

GOLDEN ROCK DITCH NEAR SEQUOIA, CAL.

Location.—In sec. 35, T. 1 S., R. 18 E., about 800 feet below diversion dam on South Fork of Tuolumne River, and 4 miles west of Sequoia, Tuolumne County.

Records available.—January 1, 1914, to June 30, 1915.

Gage.—Vertical staff fastened to left side of flume 800 feet below headgate; read once a day by an employee of Yosemite Power Co.

Discharge measurements.—Made from foot plank across flume at gage.

Channel and control.—Rectangular wooden flume in cut.

Extremes of discharge.—Maximum stage recorded during year, 2.0 feet a number of times this season (discharge, 34 second-feet); no flow November 14 to 22.

Accuracy.—Results good.

Cooperation.—Gage-height record furnished by Yosemite Power Co., through H. A. Kluegel, chief engineer.

The water is now used for irrigation around Groveland, but was formerly used for mining.

Discharge measurements of Golden Rock ditch near Sequoia, Cal., during the year ending Sept. 30, 1915.

Date.	Made by—	Gage height.	Discharge.	Date.	Made by—	Gage height.	Discharge.
		Feet.	*Sec.-ft.*			*Feet.*	*Sec.-ft.*
Oct. 30	Yosemite Power Co	1.35	13.8	July 6	H. J. Tompkins	1.65	23
Apr. 21	Charles Leidl	1.95	31				

Daily discharge, in second-feet, of Golden Rock ditch near Sequoia, Cal., for the year ending Sept. 30, 1915.

Day.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May.	June.
1	[a]6.6	11	10	13	31	[a]26	20	[a]30	34
2	6.2	14	[a]11	13	[a]30	26	26	29	[a]34
3	6.2	11	11	[a]13	29	27	27	29	34
4	[a]6.9	11	21	[a]14	[a]28	27	26	[a]30	[a]34
5	7.6	11	[a]18	15	26	[a]26	27	31	34
6	[a]7.8	10	[a]16	15	26	26	[a]27	29	[a]34
7	8.0	[a]9.7	14	13	26	[a]26	27	[a]30	34
8	8.0	[a]9.4	[a]14	[a]12	27	26	27	31	[a]34
9	8.0	9.1	13	11	32	26	[a]28	31	34
10	[a]8.0	[a]9.1	[a]13	18	[a]30	[a]26	29	[a]31	34
11	8.0	[a]9.1	13	14	27	26	31	32	[a]32
12	[a]7.1	[a]9.1	10	[a]14	27	26	31	[a]32	31
13	6.2	9.1	[a]9	14	[a]27	26	[a]31	31	31
14	6.2	.0	8	[a]19	27	[a]26	[a]32	[a]31	[a]31
15	[a]6.2	.0	15	24	[a]28	27	32	32	31
16	6.2	.0	13	21	29	27	34	[a]33	31
17	[a]6.8	.0	15	15	[a]30	27	34	34	[a]30
18	[a]7.4	.0	[a]14	13	31	29	[a]34	[a]24	29
19	8.0	.0	13	[a]16	29	27	34	15	[a]28
20	[a]12	.0	[a]12	18	[a]28	29	[a]33	[a]15	27
21	15	.0	11	[a]16	27	29	32	15	27
22	[a]12	.0	[a]13	15	[a]27	[a]29	[a]32	[a]20	[a]27
23	10	8.0	15	[a]15	27	29	32	24	26
24	[a]10	[a]8.0	8.4	16	[a]27	31	31	[a]26	26
25	[a]10	8.0	13	18	27	31	31	29	[a]25
26	10	[a]8.0	13	[a]20	27	31	[a]31	[a]28	24
27	[a]10	8.0	[a]13	21	26	[a]32	31	27	[a]24
28	10	[a]8.0	[a]12	24	[a]26	34	31	27	24
29	[a]12	[a]8.0	12	31	....	[a]27	[a]31	[a]28	[a]24
30	14	8.0	13	31	....	20	31	29	24
31	12	....	13	[a]31	....	[a]20	....	34	....

[a] Interpolated.

NOTE.—Discharge determined from a well-defined rating curve. No record July 1 to Sept. 30.

Monthly discharge of Golden Rock ditch near Sequoia, Cal., for the year ending Sept. 30, 1915.

Month.	Discharge in second-feet.			Run-off (total in acre-feet).	Accuracy.
	Maximum.	Minimum.	Mean.		
October	15	6.2	8.79	540	A.
November	14	.0	6.55	390	A.
December	21	8	12.9	793	A.
January	31	11	17.5	1,080	B.
February	32	26	27.9	1,550	A.
March	34	20	27.3	1,680	B.
April	34	20	30.1	1,790	A.
May	34	15	28.0	1,720	A.
June	34	24	29.7	1,770	A.
The period	....	....	....	11,300	

SOUTH FORK OF TUOLUMNE RIVER NEAR GROVELAND, CAL.

LOCATION.—At South Fork trail bridge, in Stanislaus National Forest, one-fourth mile above junction with Tuolumne River, about 10 miles east of Groveland, Tuolumne County. The Middle Fork enters about 2½ miles above the station.

DRAINAGE AREA.—Not measured.

RECORDS AVAILABLE.—September 13, 1910, to September 30, 1915 (very fragmentary).

GAGE.—Inclined staff fastened to a large boulder on right bank about 600 feet above trail bridge. Previous to May 19, 1914, gage was a vertical staff on middle pier of bridge at downstream end, and at same datum. Gage read by forest ranger George Adams, when passing the station.

Discharge measurements.—Made from car and cable 20 feet above bridge, or by wading.

Channel and control.—Composed of boulders and gravel; very rough.

Extremes of stage.—1910–1915: Maximum stage recorded, between 8 and 10 feet, January 25, 1914. A camper at the bridge said that on that date the water touched the under stringers of the foot-bridge. Minimum stage recorded, 0.35 foot August 24, 1912.

Winter flow.—Stage-discharge relation probably not affected by ice.

Diversions.—At Hardin ranch, 7 miles above the mouth, water is diverted for irrigation.

Regulation.—A small amount of storage is developed at Hardin ranch.

Accuracy.—Results good for days when gage was read.

Cooperation.—Gage-height record furnished by United States Forest Service.

The following discharge measurement was made by Charles Leidl:

April 22, 1915: Gage height, 5.18 feet; discharge, 501 second-feet.

Daily discharge, in second-feet, of South Fork of Tuolumne River near Groveland, Cal., for the year ending Sept. 30, 1915.

Day.	Dec.	Jan.	Apr.	July.	Aug.	Sept.	Day.	Dec.	Jan.	Apr.	July.	Aug.	Sept.
1							16					20	
2						8.5	17						
3							18						
4							19						
5					29		20				60		
6							21						8.5
7							22			501			
8							23						
9							24						
10							25						
11							26						
12							27						
13							28						
14		146					29						
15							30	18					
							31				34		

Note.—Discharge determined from a well-defined rating curve.

YOSEMITE POWER CO.'S CANAL NEAR LA GRANGE, CAL.

Location.—In the SW. ¼ sec. 16, T. 3 S., R. 14 E., at the short flume opposite La Grange dam, just above waste gate, about three-fourths mile above power house, 1½ miles northeast of La Grange, Stanislaus County, and about 13½ miles below intake.

Records available.—1908 to September 30, 1915 (not complete).

Gage.—Enameled vertical staff on right side of flume near upper end; read once a day by H. T. Sackett.

Discharge measurements.—Made in flume just below gage.

Channel and control.—Rectangular ditch excavated mostly in shale rock.

Extremes of discharge.—1910–1915: Maximum stage recorded, full head, 2.9 feet (discharge, 66 second-feet) occurs at various times of most every year; no flow during periods of every year.

Accuracy.—Results excellent.

Cooperation.—Gage-height record furnished by Turlock Irrigation District through R. V. Meikle, chief engineer.

The Yosemite Power Co.'s canal takes water from the south side of Tuolumne River at Indian Bar, in the SW. ¼ sec. 6, T. 2 S., R. 15 E., about 15 miles above the town of La Grange. This canal was built in the early days to supply water for hydraulic mining in the vicinity of La Grange, and is now locally known as the "La Grange mining ditch." Recently it has been thoroughly repaired and is now used as a supply canal for the new hydroelectric plant which was installed in the latter part of 1907. The power house is situated on the left bank of the river about half a mile above the town of La Grange and is below the dam and headworks of the Turlock and Modesto irrigation canals.

Discharge measurements of Yosemite Power Co.'s canal near La Grange, Cal., during the year ending Sept. 30, 1915.

[Made by Charles Leidl.]

Date.	Gage height.	Discharge.	Date.	Gage height.	Discharge.
	Feet.	*Sec.-ft.*		*Feet.*	*Sec.-ft.*
Mar. 20	2.85	67	Aug. 2	2.75	60
22	2.85	65			

Daily discharge, in second-feet, of Yosemite Power Co.'s canal near La Grange, Cal., for the year ending Sept. 30, 1915.

Day.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.
1	62	62	62	62	38	56	59	62	62	62	62	62
2	62	62	62	66	29	56	59	62	66	62	62	62
3	62	62	62	62	26	56	59	62	62	62	62	62
4	62	62	62	53	41	56	62	62	66	62	62	62
5	62	62	53	59	56	59	62	62	66	62	62	62
6	62	62	56	59	62	62	53	62	66	62	62	62
7	62	62	5.2	59	62	62	62	62	66	62	62	62
8	62	62	59	62	62	62	62	62	66	62	62	62
9	62	0	62	44	32	62	62	62	0	62	62	59
10	62	18	56	14	32	62	9	62	62	62	62	62
11	62	62	62	62	32	62	62	62	62	62	22	59
12	62	62	59	29	50	62	62	62	62	62	62	62
13	0	62	62	62	59	62	62	62	62	62	62	62
14	47	62	62	53	59	62	62	62	62	62	62	62
15	62	62	2	59	62	62	62	62	62	62	59	62
16	0	62	62	10	53	36	62	62	62	62	62	0
17	62	62	62	62	50	62	62	62	62	62	62	59
18	62	62	62	62	56	62	4.5	59	62	62	62	59
19	62	62	62	62	56	62	0	59	62	62	62	59
20	62	62	62	62	44	62	62	62	62	62	62	0
21	62	62	62	62	50	62	62	62	62	62	62	0
22	62	62	62	62	50	62	62	62	62	62	62	59
23	62	62	62	62	50	62	62	62	62	31	62	62
24	62	62	62	62	53	62	62	62	62	62	62	62
25	62	62	64	50	50	62	62	62	62	62	62	62
26	62	62	66	59	56	62	0	62	62	62	62	62
27	62	62	62	62	59	62	62	62	62	62	62	62
28	62	62	62	50	50	62	62	62	62	62	62	62
29	62	62	62	38	....	35	62	62	62	0	62	62
30	62	62	62	38	....	56	62	62	62	62	62	59
31	62	....	62	38	....	62	....	62	....	62	62	....

NOTE.—Discharge determined from a well-defined rating curve. No gage readings Dec. 25, May 25, June 5, Aug. 7 and Sept. 14; discharge interpolated. No reading Sept. 19; discharge estimated.

Monthly discharge of Yosemite Power Co.'s canal near La Grange, Cal., for the year ending Sept. 30, 1915.

Month.	Discharge in second-feet.			Run-off (total in acre-feet).	Accuracy.
	Maximum.	Minimum.	Mean.		
October	62	0.0	57.5	3,540	A.
November	62	.0	58.5	3,480	A.
December	66	2	57.6	3,540	A.
January	66	10	53.1	3,260	A.
February	62	26	49.2	2,730	A.
March	62	35	59.2	3,640	A.
April	62	.0	53.6	3,190	A.
May	62	59	61.8	3,800	A.
June	66	.0	60.7	3,610	A.
July	62	.0	59.0	3,630	A.
August	62	22	60.6	3,730	A.
September	62	.0	55.1	3,280	B.
The year	66	.0	57.2	41,400	

MODESTO CANAL NEAR LA GRANGE, CAL.

Location.—In the SE. ¼ sec. 17, T. 3 S., R. 14 E., below waste gates and 460 feet below intake at La Grange dam on Tuolumne River, and about 1½ miles northeast of La Grange, Stanislaus County. Canal is on right bank of river.

Records available.—April 26, 1903, to September 30, 1915.

Gage.—Vertical iron staff in concrete well on left bank; read twice a day and operation of head gates noted by E. A. Townsend. Gage and its position have remained unchanged since beginning of record.

Discharge measurements.—Made from footbridge 550 feet below gage. This section of canal is lined with concrete.

Channel and control.—Canal is concrete lined and control is length of canal. For the last couple of years, timber flumes that composed the canal a mile or more below the station, have been gradually replaced by fills with concrete lining; and the cross section was increased. The discharge per foot stage above 1.5 feet has been increased.

Extremes of discharge.—Maximum stage recorded during year and period 1903-1915, 4.2 feet from June 8 to July 17, 1915 (discharge 7.48 second feet); no flow during periods in every year.

Accuracy.—No débris deposited in canal throughout year; record of operation of head gates satisfactory; results excellent.

Cooperation.—Gage-height record furnished by Modesto irrigation district, through F. A. Townsend, patrolman.

The water is used for irrigation in the Modesto irrigation district.

Discharge measurements of Modesto canal near La Grange, Cal., during the year ending Sept. 30, 1915.

[Made by Charles Leidl.]

Date.	Gage height.	Discharge.	Date.	Gage height.	Discharge.
	Feet.	*Sec.-ft.*		*Feet.*	*Sec.-ft.*
Mar. 21	3.80	660	Mar. 23	3.29	568
23	.94	91	May 4	4.00	697
23	1.96	289	Aug. 24	.72	55
23	2.60	430			

Daily discharge, in second-feet, of Modesto canal near La Grange, Cal., for the year ending Sept. 30, 1915.

Day.	Nov.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.
1		0.0	42	22	687	666	646	748	216	44
2		.0	42	.0	687	666	666	748	195	42
3		36	42	65	687	708	708	748	185	44
4		9.5	42	246	687	708	708	748	185	44
5		.0	42	298	687	708	728	748	169	42
6		.0	42	298	687	708	728	748	155	42
7		.0	42	298	605	708	531	748	155	42
8		.0	42	298	502	708	748	748	147	42
9		.0	23	380	502	708	748	748	143	36
10		.0	.0	400	482	708	748	748	131	36
11		.0	.0	441	400	708	748	748	131	29
12		49	.0	523	400	708	748	748	124	30
13		42	105	544	400	666	748	748	120	30
14		42	441	544	317	666	748	748	124	30
15		42	336	544	400	666	748	748	107	.0
16		30	544	544	420	666	748	748	106	.0
17		.0	605	544	482	584	748	748	111	.0
18		42	544	605	502	564	748	708	87	.0
19		42	151	646	564	523	748	584	80	5
20		42	.0	666	584	523	748	502	71	33
21		42	.0	666	564	523	748	482	67	48
22		35	.0	666	564	523	748	584	61	33
23		.0	.0	564	564	523	748	626	57	30
24		.0	.0	666	584	523	748	687	58	26
25		25	.0	687	626	523	748	687	55	26
26	1.2	42	.0	687	626	564	748	502	62	26
27	1.6	42	.0	687	605	564	748	400	58	30
28		42	31	687	626	584	748	359	50	30
29		42		626	626	605	748	359	49	29
30		42		687	646	605	748	267	39	28
31		42		687		626		246	38	

NOTE.—Discharge determined from a well-defined rating curve. No flow Oct. 1 to Nov. 25 and Nov. 28 to Jan. 2.

Monthly discharge of Modesto canal near La Grange, Cal., for the year ending Sept. 30, 1915.

Month.	Discharge in second-feet.			Run-off (total in acre-feet).	Accuracy.
	Maximum.	Minimum.	Mean.		
October	0	0	0	0	
November	1.6	0	.09	5	
December	0	0	0	0	
January	49	0	23.6	1,450	A.
February	605	0	111	6,160	A.
March	687	0	491	30,200	A.
April	687	317	557	33,100	A.
May	708	523	627	38,600	A.
June	748	531	731	43,500	A.
July	748	246	636	39,100	A.
August	216	38	108	6,640	A.
September	48	0	29.2	1,740	A.
The year	748	0	277	200,000	

TURLOCK CANAL NEAR LA GRANGE, CAL.

LOCATION.—In the SW. ¼ sec. 16, T. 3 S., R. 14 E., just below spillway and about 150 feet below intake tunnel which takes water from Tuolumne River above La Grange dam; and about 1¼ miles northeast of La Grange, Stanislaus County. Canal is on left bank of river.

RECORDS AVAILABLE.—July, 1899, to September 30. 1915.

Gage.—Vertical staff float in concrete well; read by H. T. Sackett.

Discharge measurements.—Made from foot plank across lined section of canal at Snake Ravine, about 1 mile below gage.

Channel and control.—Cut partially lined and fill completely lined. Control is length of channel.

Extremes of discharge.—1907–1915: Maximum mean daily discharge, 1,610 second-feet, July 14 and 15, 1915; no flow during periods of every year. Capacity of canal is about 1,800 second-feet.

Cooperation.—Daily-discharge record February 1 to August 31 furnished in acre-feet by Turlock irrigation district through R. V. Meikle, chief engineer.

The water is used to irrigate 95,698 acres of the Turlock irrigation district.

Discharge measurements of Turlock canal near La Grange, Cal., during the year ending Sept. 30, 1915.

[Made by Charles Leidl.]

Date.	Gage height.	Discharge.	Date.	Gage height.	Discharge.
	Feet.	*Sec.-ft.*		*Feet.*	*Sec.-ft.*
Mar. 21	1.36	17	Mar. 23	6.40	1,140
22	2.80	148	May 3	7.30	1,380
22	4.16	413	4	4.92	665
23	5.10	698	Aug. 24	2.65	123

Daily discharge, in second-feet, of Turlock canal near La Grange, Cal., for the year ending Sept. 30, 1915.

Day.	Oct.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.
1	114	10	345	909	1,300	749	1,510	357	86
2	108	10	380	909	1,370	849	1,550	432	90
3	102	5	458	899	1,480	853	1,530	397	91
4	96	5	458	774	1,480	857	1,570	378	91
5	70	0	458	771	1,480	0	1,530	364	....
6	74	0	525	886	1,480	771	1,550	354	....
7	61	63	599	886	1,460	849	1,580	320	....
8	53	63	599	872	1,460	1,080	1,580	308	....
9	53	0	649	834	1,440	1,240	1,570	290	....
10	57	20	673	834	1,440	314	1,600	256	....
11	....	0	722	673	1,420	932	1,600	238	....
12	....	0	821	663	1,280	1,370	1,590	229	....
13	....	0	928	649	1,300	1,460	1,600	211	....
14	....	0	932	652	1,280	1,500	1,610	202	....
15	....	0	932	663	1,300	1,480	1,610	188	....
16	....	160	886	652	1,280	1,460	265	174	....
17	....	160	863	663	1,260	1,440	822	172	....
18	....	247	799	665	921	1,400	822	181	....
19	....	247	821	649	899	1,510	1,490	164	....
20	....	238	871	699	1,080	1,510	1,490	154	....
21	....	238	582	652	1,210	1,520	1,400	140	....
22	....	247	582	722	1,220	1,510	1,580	132	....
23	....	247	619	771	1,210	1,460	1,580	126	....
24	....	247	1,080	761	1,080	1,460	1,590	124	....
25	....	247	1,210	771	921	1,500	1,600	120	....
26	....	345	932	871	871	1,490	1,440	121	....
27	....	345	899	921	859	1,500	1,330	125	....
28	....	345	886	1,260	859	1,500	846	111	....
29	....	....	799	1,260	834	1,500	661	101	....
30	....	....	871	1,300	834	1,500	604	91	....
31	....	....	983	....	821	....	529	91	....

Note.—Discharge Oct. 1-10 determined from a well-defined rating curve and one gage-height reading a day; Feb. 1 to Aug. 31 furnished by the Turlock irrigation district; and Sept. 1-4 estimated by U. S. Geological Survey from one gage-height reading a day and the statement made by R. V. Meikle of the district that 90 second-feet was running. Canal dry Oct. 11 to Jan. 31 and Sept. 5-30.

Monthly discharge of Turlock canal near La Grange, Cal., for the year ending Sept. 30, 1915.

Month.	Discharge in second-feet.			Run-off (total in acre-feet).
	Maximum.	Minimum.	Mean.	
October	114	0	25.4	1,560
November	0	0	0	0
December	0	0	0	0
January	0	0	0	0
February	345	0	125	6,940
March	1,210	345	747	45,900
April	1,300	649	816	48,600
May	1,480	821	1,200	73,800
June	1,520	0	1,220	72,600
July	1,610	265	1,340	82,400
August	432	91	215	13,200
September	91	0	11.9	708
The year	1,610	0	477	346,000

NOTE.—Monthly and yearly discharge computed by engineers of the U. S. Geological Survey.

MIDDLE FORK OF STANISLAUS RIVER AT SAND BAR FLAT, NEAR AVERY, CAL.

LOCATION.—At Sand Bar Flat, in Tuolumne County, about 3 miles below Bakers Crossing, 11 miles above junction with North Fork of Stanislaus River, and 11 miles southeast of Avery, Calaveras County.

DRAINAGE AREA.—Not measured.

RECORDS AVAILABLE.—September 1, 1905, to September 30, 1915.

GAGE.—Staff showing depth of water over crest of dam. There is also a staff in flume below dam.

DISCHARGE.—Flow over dam computed from formula developed by company. Current meter measurements made in flume. Discharge, as published, is combined flow of river over dam and discharge of flume.

CHANNEL AND CONTROL.—See information under "Discharge."

EXTREMES OF DISCHARGE.—1905–1910 and 1912–1915: Maximum mean daily discharge, 9,760 second-feet, March 19, 1907; minimum mean daily discharge, 50 second-feet, November 22, 1905.

WINTER FLOW.—No information.

DIVERSIONS.—None.

REGULATION.—Relief reservoir, on Relief Creek about 1 mile above the mouth of the creek, has a capacity of 16,000 acre-feet.

COOPERATION.—Daily-discharge record furnished by Sierra & San Francisco Power Co., through H. F. Jackson, general manager.

Daily discharge, in second-feet, of Middle Fork of Stanislaus River at Sand Bar Flat, near Avery, Cal., for the year ending Sept. 30, 1915.

Day.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.
1	214	226	202	89	445	394	1,100	1,640	4,420	2,150	484	251
2	212	211	128	90	519	356	1,240	1,410	4,020	2,220	478	254
3	211	205	102	91	402	339	1,590	1,360	3,570	2,290	474	246
4	209	219	124	102	319	338	1,720	1,350	3,000	2,190	454	244
5	208	222	112	91	326	368	1,460	1,360	3,000	2,060	437	230
6	213	219	112	93	319	328	1,240	1,420	3,280	1,630	430	219
7	215	226	114	97	64	249	1,300	1,490	3,730	1,390	398	248
8	210	221	124	88	371	263	1,200	1,780	3,990	1,440	361	250
9	210	215	99	95	383	284	1,350	1,820	3,960	1,640	328	251
10	205	228	132	80	371	359	1,600	2,160	3,670	1,660	340	245
11	199	234	126	93	279	390	1,890	3,580	3,370	1,690	312	248
12	197	233	128	99	194	385	2,120	3.210	2,740	1,790	259	240
13	214	232	114	93	194	404	2,440	3,530	2,390	1,590	250	249
14	216	230	127	190	187	495	1,810	2,660	2,320	1,440	242	250
15	221	233	97	110	192	576	1,770	2,510	2,560	1,260	252	253
16	226	228	136	88	215	682	2,030	2,930	2,710	1,040	248	251
17	233	235	153	118	628	792	2,470	3,660	2,550	1,050	214	252
18	234	235	137	100	535	883	2,730	2,980	2,430	988	237	250
19	232	234	124	101	490	898	2,940	2,650	2,460	1,000	229	249
20	233	233	133	100	490	955	3,010	2,400	2,290	967	226	251
21	231	234	119	101	390	1,040	2,760	2,140	2,200	974	247	250
22	206	229	123	97	351	1,140	2,560	2,200	2,300	1,160	247	253
23	214	233	121	93	346	1,270	2,530	2,470	2,370	1,300	256	252
24	234	234	120	95	327	1,370	2,290	2,720	2,320	1,130	255	252
25	233	222	126	100	325	1,400	2,040	2,410	2,170	932	245	256
26	223	202	123	94	320	1,290	1,910	2,500	1,920	844	203	256
27	233	207	105	103	367	1,040	1,900	2,720	1,880	689	241	256
28	233	206	91	151	463	1,400	2,230	3,750	2,010	584	244	257
29	234	220	92	199	....	1,290	2,090	3,880	2,150	534	242	253
30	262	193	90	171	....	1,110	1,880	3,690	2,210	535	243	241
31	255	....	88	164	....	1,000	....	4,050	....	532	246	....

Monthly discharge of Middle Fork of Stanislaus River at Sand Bar Flat, near Avery, Cal., for the year ending Sept. 30, 1915.

Month.	Discharge in second-feet.			Run-off (total in acre-feet).
	Maximum.	Minimum.	Mean.	
October	262	197	222	13,600
November	235	193	223	13,300
December	202	88	120	7,380
January	199	80	109	6,700
February	628	64	350	19,400
March	1,400	249	745	45,800
April	3,010	1,100	1,970	117,000
May	4,050	1,350	2,530	156,000
June	4,420	1,880	2,800	167,000
July	2,290	532	1,310	80,600
August	484	203	301	18,500
September	257	219	219	14,800
The year	4,420	64	911	660,000

Note.—Monthly and yearly discharge computed by engineers of the U. S. Geological Survey.

STANISLAUS RIVER AT KNIGHTS FERRY, CAL.

Location.—In the NE. ¼ sec. 29, T. 1 S., R. 12 E., at Knights Ferry, Stanislaus County, 12 miles northeast of Oakdale, and about 25 miles below mouth of South Fork.

Drainage area.—935 square miles.

Records available.—May 19, 1903, to September 30, 1915. From May 3, 1895, to February 16, 1901, a station was maintained one-half mile north of Oakdale.

Gage.—Staff in five sections on right bank—two vertical and three inclined; read twice a day by E. J. Coop. The original gage datum has been maintained, although several changes have been made in the gage. Zero of gage is 157.53 feet above sea level, United States Geological Survey datum.

Discharge measurements.—Made from cable (Pl. VI, *A*, p. 166) 50 feet upstream from gage or by wading.

Channel and control.—Small boulders and gravel; slightly shifting during high water. One channel at all stages.

Extremes of discharge.—Maximum stage recorded during year, 12.8 feet at 7 a. m. May 13 (discharge, 11,100 second-feet); minimum stage recorded, 4.06 feet October 19 to 21 (estimated discharge, 4 second-feet).

1903–1915: Maximum stage recorded, 26.0 feet at 4 a. m. January 31, 1911 (discharge, 60,000 second-feet); no flow December 3 to 5, 1912.

Diversions.—Ditches diverting water for mining purposes are numerous above the station. Water is also diverted from the South Fork into the Tuolumne basin and from the North Fork for use in the vicinity of Murphy and Angels (see Utica Gold Mining Co.'s canal near Avery). The South San Joaquin canal[1] heads on the right bank and the Oakdale canal on the left bank at Goodwin dam, 4 miles above Knights Ferry (gaging stations are maintained on these canals near their intakes.) Some power is occasionally developed at Knights Ferry above the station. The water diverted for power purposes on Middle Fork at Sand Bar Flat near Avery is returned to the river several miles above this station.

Regulation.—Storage is developed in Middle Fork (see Relief Creek near Baker Station), North Fork and South Fork drainages.

Accuracy.—Results good. The total flow of river at this point is determined by combining the discharge at the river gaging station with the discharge of South San Joaquin and Oakdale canals. Results affected by many small diversions for irrigation and mining purposes.

Discharge measurements of Stanislaus River at Knights Ferry, Cal., during the year ending Sept. 30, 1915.

Date.	Made by —	Gage height.	Discharge.	Date.	Made by —	Gage height.	Discharge.
		Feet.	*Sec.-ft.*			*Feet.*	*Sec.-ft.*
Dec. 6	Charles Leidl..........	5.41	308	June 9	Charles Leidl..........	11.06	7,720
Feb. 20	H. J. Tompkins........	9.61	4,200	Aug. 27	.....do..................	4.32	9.2
May 22	Charles Leidl..........	9.29	4,400				

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[1] This canal serves lands previously irrigated from Stanislaus & San Joaquin Water Co.'s canal (now abandoned) and furnishes water for domestic purposes at Knights Ferry, replacing Schell's ditch.

Daily discharge, in second-feet, of Stanislaus River at Knights Ferry, Cal., for the year ending Sept. 30, 1915.

Day.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.
1	15	460	245	129	4,730	1,530	1,350	2,170	9,010	2,050	45	14
2	15	184	205	135	5,060	1,180	1,350	1,720	8,350	2,050	45	14
3	15	249	205	120	4,280	940	1,940	1,350	6,860	2,380	50	14
4	15	269	245	225	1,930	800	2,530	1,100	5,700	2,490	50	14
5	15	265	294	205	1,360	730	1,940	1,260	5,350	2,050	50	14
6	15	285	308	308	940	700	1,530	1,260	5,520	1,370	50	14
7	13	285	237	550	820	700	1,440	1,530	7,280	840	48	14
8	13	217	205	550	1,180	640	1,530	2,050	7,700	665	46	14
9	13	245	213	330	6,140	535	1,440	2,050	7,490	805	16	14
10	13	285	285	330	6,520	610	1,830	4,170	6,460	875	16	14
11	11	205	490	265	2,770	560	2,530	6,100	5,880	982	19	14
12	11	233	380	316	1,440	560	3,280	6,300	4,420	945	19	14
13	11	245	281	316	1,020	560	3,710	9,310	3,480	982	19	14
14	11	205	209	1,260	730	610	2,530	6,460	3,090	805	21	14
15	11	245	205	715	700	730	2,290	5,520	3,610	700	16	19
16	11	245	205	460	585	1,060	3,150	7,070	3,610	500	14	14
17	11	245	285	326	3,420	1,180	4,170	8,130	3,350	344	14	14
18	11	225	321	290	3,280	1,350	4,990	7,280	3,090	188	14	14
19	4	205	303	277	2,170	1,350	5,520	5,880	3,090	173	14	14
20	4	205	520	261	2,890	1,440	5,900	4,860	2,840	184	14	14
21	4	213	281	245	2,410	1,260	4,820	4,140	2,490	173	14	14
22	20	205	245	269	1,720	1,620	4,330	4,280	2,490	114	14	14
23	90	198	205	249	1,620	1,720	4,170	5,020	2,720	300	14	14
24	32	205	193	229	1,350	1,830	3,020	5,180	2,600	173	14	14
25	25	205	181	330	1,100	1,940	2,890	5,020	2,380	98	14	14
26	15	205	170	294	980	1,720	2,770	4,860	2,050	43	14	14
27	13	205	170	340	835	1,440	2,650	6,660	1,650	40	10	14
28	11	205	170	2,690	2,530	2,050	3,560	8,130	1,750	40	14	14
29	11	205	135	1,730	....	2,770	3,280	7,910	1,850	40	14	14
30	152	205	120	1,630	....	1,830	2,890	7,280	2,050	40	14	14
31	285	....	129	1,440	....	1,440	....	7,910	....	45	14	....

NOTE.—Discharge determined from three rating curves as follows: Oct. 1 to Feb. 10, fairly well defined below 6,000 second-feet; Feb. 11 to May 13, fairly well defined; May 14 to Sept. 30, well defined. Daily discharge Oct. 19–21 estimated from gage-height record and current-meter measurement of Aug. 27, 1914; July 27 to Aug. 3 estimated; Dec. 24, 25, July 17, Aug. 19, 23, 24, and Sept. 12, interpolated.

Monthly discharge of Stanislaus River at Knights Ferry, Cal., for the year ending Sept. 30, 1915.

Month.	Discharge in second-feet.			Run-off (total in acre-feet).	Accuracy.
	Maximum.	Minimum.	Mean.		
October	285	4	28.9	1,780	D.
November	460	184	235	14,000	B.
December	520	120	246	15,100	B.
January	2,690	120	542	33,300	B.
February	6,520	585	2,300	128,000	B.
March	2,770	535	1,210	74,400	B.
April	5,900	1,350	2,980	177,000	B.
May	9,310	1,100	4,900	301,000	B.
June	9,010	1,650	4,270	254,000	A.
July	2,490	....	725	44,600	B.
August	50	10	23.5	1,440	D.
September	19	14	14.2	845	C.
The year	9,310	4	1,450	1,050,000	

Combined daily discharge, in second-feet, of Stanislaus River and two canals near Knights Ferry, Cal., for the year ending Sept. 30, 1915.

Day.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.
1	241	460	254	160	4,730	1,530	1,590	2,680	9,570	3,010	512	280
2	243	184	214	166	5,060	1,180	1,730	2,250	8,950	3,010	471	295
3	243	249	214	151	4,280	940	2,320	1,970	7,600	2,950	482	298
4	238	269	254	256	1,930	800	2,910	1,800	6,480	2,770	470	295
5	235	265	303	444	1,360	730	2,320	1,960	6,110	2,800	477	298
6	238	285	317	531	940	700	1,910	1,960	6,280	2,280	447	280
7	236	285	246	773	820	700	1,810	2,250	7,960	1,750	442	274
8	241	217	214	773	1,180	640	1,890	2,760	8,450	1,580	437	280
9	241	245	222	553	6,140	535	1,800	2,760	8,300	1,720	328	292
10	239	285	293	553	6,520	610	2,190	4,900	7,420	1,790	323	274
11	239	205	555	488	2,770	560	2,890	6,760	6,850	1,890	338	280
12	234	233	380	539	1,440	688	3,650	6,880	5,370	1,860	338	315
13	234	245	281	539	1,020	743	4,080	9,910	4,460	1,720	335	280
14	237	205	209	1,480	730	793	2,890	7,040	4,070	1,550	322	303
15	234	245	205	938	700	925	2,650	6,100	4,590	1,440	309	306
16	203	245	205	460	585	1,260	3,510	7,660	4,600	1,240	382	442
17	247	259	285	326	3,420	1,380	4,550	8,730	4,350	1,080	265	310
18	269	239	321	290	3,280	1,540	5,370	7,880	4,090	929	286	310
19	262	219	303	277	2,170	1,580	5,970	6,460	4,090	901	286	318
20	273	219	520	261	2,890	1,750	6,460	5,440	3,840	920	315	298
21	284	227	281	245	2,410	1,590	5,390	4,730	3,490	914	307	292
22	369	219	245	269	1,720	1,820	4,900	4,870	3,480	845	292	304
23	359	212	205	249	1,620	1,920	4,740	5,610	3,760	1,130	280	292
24	279	214	193	229	1,350	2,150	3,580	5,780	3,590	1,080	283	292
25	272	210	197	330	1,100	2,190	3,390	5,610	3,340	990	274	295
26	262	210	198	294	980	1,900	2,980	5,430	3,010	800	292	310
27	260	210	201	340	835	1,710	2,960	7,300	2,610	695	270	289
28	258	210	201	2,740	2,660	2,330	4,010	8,740	2,710	650	286	292
29	155	214	166	2,010	....	3,050	3,730	8,520	2,810	609	298	298
30	152	214	151	1,630	....	2,010	3,350	7,960	3,010	514	274	298
31	285	....	160	1,440	....	1,620	....	8,600	....	512	280	....

NOTE.—See p. 201 for daily-discharge table of Oakdale canal, and p. 199 for that of South San Joaquin canal.

Combined monthly discharge of Stanislaus River and two canals near Knights Ferry, Cal., for the year ending Sept. 30, 1915.

Month.	Discharge in second-feet.			Run-off (total in acre-feet).
	Maximum.	Minimum.	Mean.	
October	369	152	250	15,400
November	460	184	240	14,300
December	555	151	258	15,900
January	2,740	151	637	39,200
February	6,520	585	2,310	128,000
March	3,050	535	1,350	83,000
April	6,460	1,590	3,380	201,000
May	9,910	1,800	5,530	340,000
June	9,570	2,610	5,170	308,000
July	3,010	512	1,480	91,000
August	512	265	345	21,200
September	442	274	300	17,900
The year	9,910	151	1,760	1,270,000

NOTE.—See p. 201 for monthly-discharge table of Oakdale canal, and p. 200 for that of South San Joaquin canal.

RELIEF RESERVOIR NEAR BAKER STATION, CAL.

LOCATION.—Dam is in the NW. ¼ sec. 13, T. 5 N., R. 20 E., on Relief Creek about five-eights mile above junction with East Fork, and about 3½ miles southeast of Baker Station, Tuolumne County.

DRAINAGE AREA.—Not measured.

Records available.—October 1, 1910, to September 30, 1915.

Gage.—No information.

Extremes of storage.—Maximum storage recorded 1910–1915: 15,200 acre-feet, July 2 to 13 and 26 to 31, 1913; reservoir empty during periods of every year.

Cooperation.—Daily-storage record furnished by Sierra & San Francisco Power Co. through H. F. Jackson, general manager.

The reservoir is used for storage for power by the Sierra & San Francisco Power Co. The water is released down Relief Creek to the Middle Fork of Stanislaus River at Sand Bar Flat, where it is diverted. During the winter the reservoir gates are left open.

Storage, in acre-feet, in Relief reservoir near Baker Station, Cal., for the year ending Sept. 30, 1915.

Day.	Oct.	Nov.	Dec.	May.	June.	July.	Aug.	Sept.
1	10,800	6,100	960	0	3,520	11,900	14,900	13,300
2	10,700	6,010	960	0	3,730	12,200	14,900	13,200
3	10,400	5,920	960	67	3,900	12,200	15,000	13,000
4	10,200	5,790	947	71	4,090	12,300	15,000	12,900
5	10,100	5,660	955	78	4,320	12,300	15,000	12,700
6	9,920	5,520	925	122	4,590	12,400	15,000	12,600
7	9,720	5,360	907	188	4,990	12,700	15,000	12,300
8	9,560	5,200	877	257	5,280	12,700	15,000	12,100
9	9,410	5,020	841	260	5,590	12,900	15,000	11,900
10	9,250	4,820	813	276	5,770	13,100	15,000	11,900
11	9,250	4,670	782	491	5,910	13,400	15,000	11,400
12	8,880	4,450	749	435	6,040	13,500	15,000	11,200
13	8,700	4,230	710	473	6,240	13,700	15,000	11,000
14	8,490	4,070	672	532	6,510	13,800	15,000	10,800
15	8,280	3,860	631	620	6,970	13,900	14,900	10,600
16	8,040	3,670	586	744	7,260	14,000	14,900	10,300
17	7,800	3,500	523	884	7,460	14,200	14,900	10,000
18	7,600	3,270	462	1,030	7,840	14,300	14,900	9,750
19	7,450	3,070	398	1,150	8,200	14,400	14,900	9,490
20	7,310	2,860	350	1,220	8,430	14,500	14,800	9,220
21	7,180	2,640	296	1,320	8,930	14,600	14,700	8,970
22	7,110	2,420	245	1,450	9,110	14,800	14,600	8,680
23	6,990	2,230	191	1,720	9,520	14,800	14,500	8,400
24	6,830	2,020	133	1,820	10,100	14,800	14,400	8,120
25	6,700	1,870	67	1,950	10,000	14,900	14,400	7,860
26	6,560	1,660	0	1,920	10,200	14,900	14,200	7,610
27	6,380	1,500	0	2,400	10,500	14,800	14,100	7,350
28	6,240	1,360	0	2,660	11,000	14,900	14,000	7,080
29	6,090	1,220	0	2,840	11,500	14,900	13,800	6,850
30	6,090	1,070	0	3,100	11,700	14,900	13,700	6,600
31	6,100	....	0	3,330	....	14,900	13,500	....

Note.—No water stored during the period Dec. 26 to May 2.

RELIEF CREEK NEAR BAKER STATION, CAL.

Location.—In the NW. ¼ sec. 13, T. 5 N., R. 20 E., one-fourth mile below Relief reservoir of the Sierra & San Francisco Power Co., one-fourth mile above junction with East Fork, and about 3 miles southeast of Baker Station, Tuolumne County.

Drainage area.—Not measured.

Records available.—October, 1910 to September 30, 1915 (incomplete).

Gage.—No information.

Discharge.—Computed from gage-height record at weir, which gives the combined flow over spillway and through outlet gates of dam.

Channel and control.—See preceding paragraph.

Extremes of discharge.—1912–1915: Maximum mean daily discharge, 795 second-feet, June 23, 1914; no flow April 9 to May 25 and June 24 to 28, 1913.

Winter flow.—No information.

Diversions.—None.

Regulations.—See Relief reservoir.

Cooperation.—Daily-discharge record furnished by Sierra & San Francisco Power Co., through H. F. Jackson, general manager.

Daily discharge, in second-feet, of Relief Creek below Relief reservoir, near Baker Station, Cal., for the year ending Sept. 30, 1915.

Day.	Oct.	Nov.	Dec.	Jan.	Apr.	May.	June.	July.	Aug.	Sept.
1	101	75	10.1	7.8	....	79	320	270	59	107
2	101	75	10	7.8	....	58	380	350	59	107
3	101	75	10	7.2	....	44	380	380	60	89
4	101	101	20	7.2	....	59	220	380	59	89
5	101	101	20	7.2	....	50	142	295	57	78
6	109	101	20	7.2	....	38	240	180	56	99
7	109	115	30	6.6	....	38	280	77	48	118
8	101	106	30	....	....	61	420	148	42	128
9	91	106	30	....	....	80	390	220	42	128
10	91	125	30	....	....	67	420	220	42	118
11	91	125	30	....	....	67	340	170	41	128
12	91	125	30	....	....	126	190	295	34	118
13	112	115	33	....	....	123	137	225	33	128
14	112	115	33	....	....	62	137	170	30	122
15	122	125	32	....	....	62	137	137	49	131
16	132	125	40	....	....	80	285	80	42	131
17	132	125	40	....	....	116	240	79	41	131
18	113	125	40	....	185	134	185	103	29	131
19	123	125	40	....	210	118	215	130	44	136
20	109	130	40	....	235	80	215	86	52	141
21	78	130	40	....	207	15.1	138	115	71	141
22	66	130	40	....	148	1.6	138	153	81	152
23	101	130	40	....	141	1.6	218	225	91	152
24	130	120	40	....	128	66	210	148	11.1	152
25	91	109	40	....	126	66	175	99	11.1	154
26	111	101	9.4	....	126	53	124	128	91	135
27	131	110	9.4	....	109	94	124	94	91	151
28	106	101	8.1	....	149	198	124	40	91	134
29	106	101	8.1	....	134	330	230	41	91	124
30	77	101	8.1	....	109	280	270	69	101	124
31	50	....	7.8	....	....	285	....	64	101	....

Note.—No record Jan. 8 to Apr. 17.

Monthly discharge of Relief Creek below Relief reservoir, near Baker Station, Cal., for the year ending Sept. 30, 1915.

Month.	Discharge in second-feet.			Run-off (total in acre-feet).
	Maximum.	Minimum.	Mean.	
October	132	50	103	6,330
November	130	75	112	6,660
December	40	7.8	26.4	1,620
January 1-7	7.8	6.6	7.29	101
April 18-30	235	109	154	3,970
May	330	1.6	94.6	5,820
June	420	124	234	13,900
July	380	40	167	10,300
August	101	11.1	56.5	3,470
September	154	78	126	7,500

Note.—Monthly discharge computed by engineers of the U. S. Geological Survey.

NORTH FORK OF STANISLAUS RIVER NEAR AVERY, CAL.

Location.—In sec. 35, T. 5 N., R. 15 E., 700 feet above intake of Utica Gold Mining Co.'s canal, and about 5 miles northeast of Avery, Calaveras County.

Drainage area.—Not measured.

Records available.—July 14, 1914 to September 30, 1915.

Gage.—Vertical staff in two sections on right bank; read once a day by James Hunter.

Discharge measurement.—Made from car and cable 35 feet below gage or by wading.

Channel and control.—Large boulders and gravel; appear permanent. One channel at all stages.

Extremes of discharge.—Maximum stage recorded during year, 8.7 feet at 10 a. m. May 11 (discharge, 5,250 second-feet); minimum stage recorded, 1.0 foot for about 12 days in November and at 11 a. m. September 30 (discharge, 34 second-feet).

Diversions.—Water is diverted from Beaver Creek into the North Fork about half a mile above the station.

Regulation.—A small amount of storage is developed on the headwaters of this stream above the station.

Accuracy.—Results good. Rating curve well defined for medium stages. Estimates of low water are a little uncertain due to regulation.

Cooperation.—Gage-height furnished by Utica Gold Mining Co.

Discharge measurements of North Fork of Stanislaus River near Avery, Cal., during the year ending Sept. 30, 1915.

Date.	Made by—	Gage height.	Discharge.	Date.	Made by—	Gage height.	Discharge.
		Feet.	*Sec.-ft.*			*Feet.*	*Sec.-ft.*
Feb. 14	H. J. Tompkins........	1.85	89	May 18	Charles Leidl..........	5.45	1,720
17	.....do.................	3.06	345	19	.....do.................	5.20	1,460
18	.....do.................	2.85	283	20	.....do.................	5.18	1,440
May 17	Charles Leidl..........	6.22	2,340	20	.....do.................	5.02	1,330
18	.....do.................	5.62	1,830	Aug. 1	H. D. McGlashan......	1.42	61
18	.....do.................	5.52	1,760				

Daily discharge, in second-feet, of North Fork of Stanislaus River near Avery, Cal., for the period July 14, 1914, to Sept. 30, 1915.

Day.	July.	Aug.	Sept.	Day.	July.	Aug.	Sept.	Day.	July.	Aug.	Sept.
1914.				1914.				1914.			
1	......	57	[a] 57	11	......	[a] 57	57	21	119	57	64
2	......	57	[a] 57	12	......	[a] 57	[a] 57	22	[a] 119	[a] 57	64
3	......	57	57	13	......	57	[a] 57	23	119	57	64
4	......	57	[a] 57	14	224	[a] 57	57	24	[a] 102	57	57
5	......	[a] 57	57	15	168	57	60	25	86	[a] 57	[a] 57
6	......	57	57	16	[a] 168	[a] 57	57	26	86	57	57
7	......	57	[a] 57	17	168	57	57	27	78	[a] 57	[a] 57
8	......	57	57	18	[a] 158	57	[a] 60	28	71	57	57
9	......	57	[a] 57	19	149	[a] 57	64	29	64	57	[a] 54
10	......	57	57	20	[a] 134	57	[a] 64	30	[a] 60	[a] 57	51
								31	57	57	......

[a] Interpolated.

Daily discharge, in second-feet, of North Fork of Stanislaus River near Avery, Cal., for the period July 14, 1914, 1914, to Sept. 30, 1915—Continued.

Day.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.
1914–15.												
1	51	64	[a]54	[a]57	[b]260	168	[a]820	770	2,760	545	57	64
2	51	64	57	57	[b]300	[a]168	820	[a]795	2,870	720	57	[a]64
3	51	[a]64	[a]57	57	[b]260	168	[a]820	820	2,560	585	64	64
4	[a]51	64	57	[a]57	[b]220	[a]163	820	[b]800	1,960	[a]546	64	[a]60
5	51	[a]64	57	57	[b]180	158	[a]848	930	[b]1,900	507	60	57
6	[a]51	64	57	[a]57	[b]140	158	875	875	2,350	[a]469	60	[a]60
7	51	[a]60	57	57	96	[a]158	820	[a]1,030	2,560	431	64	64
8	[a]54	57	57	57	[a]95	158	[a]875	1,180	2,350	328	[a]64	[a]64
9	57	[a]46	[a]57	[a]57	[a]94	[a]158	930	1,400	2,350	[a]304	64	64
10	[a]54	34	57	57	[a]93	158	[a]1,120	[a]3,320	1,880	280	[a]64	[a]64
11	[b]51	34	[a]51	[a]57	[a]92	[a]168	1,320	5,250	2,660	[a]266	64	64
12	[b]51	[a]34	45	57	[b]91	178	[a]1,430	[a]4,060	1,320	251	[a]64	[a]64
13	51	34	[a]45	[a]57	[b]91	[a]223	1,540	2,870	1,120	[a]214	64	64
14	[a]51	34	45	57	91	[a]268	1,470	[a]2,380	1,700	178	[a]62	[a]64
15	51	[a]34	[a]51	[a]57	[b]95	312	[b]1,400	1,880	1,180	133	60	64
16	[a]51	34	57	57	133	[a]390	1,400	2,560	1,250	[a]126	[a]60	[a]60
17	51	34	[a]57	[b]78	361	469	1,470	2,870	[a]1,150	119	60	57
18	64	[a]34	57	[a]74	280	[a]507	[a]1,760	1,700	1,050	[a]113	[a]60	[a]57
19	64	34	[b]54	71	[b]240	545	2,060	1,320	[b]1,050	107	60	57
20	64	34	57	[a]68	237	[a]610	1,960	1,320	990	96	64	57
21	64	34	[b]54	64	[a]198	675	1,880	1,250	[a]960	[a]91	[a]64	[a]57
22	64	45	57	[a]64	158	[a]775	1,700	[a]1,480	930	86	64	57
23	[a]60	[a]45	[a]57	64	[a]136	875	[b]1,650	1,700	[b]960	[a]82	[a]64	[a]57
24	57	45	57	[a]64	113	902	1,320	2,350	585	78	64	57
25	[a]54	[a]45	[a]57	64	[b]130	930	[a]1,250	[a]2,400	[a]565	[a]74	[a]64	[a]57
26	51	45	57	[b]58	141	[a]780	1,180	2,450	545	71	64	57
27	51	[a]48	[a]57	71	[a]141	630	[b]1,170	2,660	[b]550	[a]68	[a]64	57
28	[a]51	51	57	[a]78	141	[b]1,000	1,250	2,760	507	64	64	[a]54
29	51	[a]51	[a]57	86	....	820	1,470	2,350	469	[a]60	[a]64	51
30	64	51	57	96	....	[a]820	[a]1,120	[b]2,100	545	57	64	45
31	64	....	[a]57	[b]86	....	820	....	2,350	....	57	[a]64	....

[a] No record; discharge interpolated.
[b] No record; discharge estimated by comparison with Middle Fork of Stanislaus River near Avery.

NOTE.—Discharge determined from a rating curve well defined between 55 and 4,000 second-feet. Discharge July 14 to Sept. 30, 1914, supersedes that published in Water-Supply Paper 391, p. 184.

Monthly discharge of North Fork of Stanislaus River near Avery, Cal., for the period July 14, 1914, to Sept. 30, 1915.

Month.	Discharge in second-feet.			Run-off (total in acre-feet).	Accuracy.
	Maximum.	Minimum.	Mean.		
1914.					
July 14–31	224	57	118	4,210	B.
August	57	57	57.0	3,500	B.
September	64	51	58.1	3,460	B.
The period	....	....	....	11,200	
1914–15.					
October	64	51	54.9	3,380	B.
November	64	34	46.0	2,740	C.
December	57	45	55.2	3,390	B.
January	96	57	64.5	3,970	B.
February	361	91	165	9,160	C.
March	1,000	158	462	28,400	B.
April	2,060	820	1,280	76,200	B.
May	5,250	770	2,000	123,000	C.
June	2,870	469	1,450	86,300	B.
July	720	57	229	14,100	B.
August	64	57	62.6	3,850	B.
September	64	45	59.4	3,530	B.
The year	5,250	34	495	358,000	

NOTE.—Monthly-discharge table July to Sept., 1914, supersedes that published in Water-Supply Paper 391, p. 185.

UTICA GOLD MINING CO.'S CANAL NEAR AVERY, CAL.

Location.—In sec. 35, T. 5 N., R. 15 E., about 450 feet below head works on North Fork Stanislaus River, and about 5 miles northeast of Avery, Calaveras County.

Records available.—July 14, 1914, to September 30, 1915.

Gage.—Enameled vertical staff gage, installed May 19, 1915, on right side of flume; read once a day by James Hunter. Previous to May 19, 1915, gage was located 300 feet upstream and on the right bank. It was too near the headgate and could not be properly rated.

Discharge measurements.—Made from foot plank across flume at gage.

Channel and control.—Rectangular wooden flume.

Extremes of discharge.—Maximum stage recorded May 19 to September 30, 1.65 feet May 19, 1915 (discharge, 116 second-feet); minimum stage recorded, 0.55 foot May 19 (discharge, 24 second-feet).

Winter flow.—Stage-discharge relation may be affected by ice.

Accuracy.—Record does not agree with record on North Fork of Stanislaus River, just above intake, when canal is taking all the water. This may be due to the following: Gage heights not read to sufficient degree of refinement; high velocities in canal introduce uncertainties; discharge measurements subject to considerable error because of shallow depths. No estimates of discharge were prepared for the old gage read till May 18, 1915, because it could not be properly rated.

Cooperation.—Gage-height record furnished by Utica Gold Mining Co.

Discharge measurements of Utica Gold Mining Co.'s canal near Avery, Cal., during the year ending Sept. 30, 1915.

Date.	Made by—	Gage height.[a]	Gage height.[b]	Discharge.
		Feet.	*Feet.*	*Sec.-ft.*
Feb. 14	H. J Tompkins	1.20		72
May 19	Charles Leidl	.45	0.55	24
19	do	.70	.92	50
19	do	1.25	1.38	88
19	do	1.80	1.65	120
19	do		1.65	113
Aug. 1	H. D. McGlashan	1.00	1.03	60

[a] Old gage.

[b] New gage installed May 19, 1915.

Daily gage height,[a] in feet, of Utica Gold Mining Co.'s canal near Avery, Cal., for the period Oct. 1, 1914, to May 18, 1915.

Day.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May.
1	1.1	1.3				1.3		1.3
2	1.1	1.3	1.1	1.1			1.3	
3	1.1			1.1		1.3		1.3
4		1.3	1.1				1.3	
5	1.1		1.1	1.1		1.3		1.3
6		1.3	1.1			1.3	1.3	1.3
7	1.1		1.1	1.1	1.3		1.3	
8		1.2	1.1	1.1		1.3		1.3
9	1.1						1.3	1.3
10		.8	1.1	1.1		1.3		
11		.8					1.3	1.3
12			1.0	1.1		1.3		
13	1.1	.8					1.3	1.3
14		.8	.9	1.3	1.2		1.3	
15	1.1					1.3		1.3
16		.8	1.1	1.1	1.3		1.3	1.3
17	1.1	.8			1.3	1.3	1.3	1.3
18	1.3		1.1		1.3			1.3
19	1.3	.8		1.2		1.3	1.3	
20	1.3	.8	1.1		1.3		1.3	
21	1.3	.8		1.2		1.3	1.3	
22	1.3	.9	1.1		1.3		1.3	
23				1.2		1.3		
24	1.2	.9	1.1		1.3		1.3	
25				1.2		1.3		
26	1.1	.9	1.1		1.3		1.3	
27	1.1			1.3		1.3		
28		1.0	1.1		1.3		1.3	
29	1.1			1.3		1.3	1.3	
30	1.3	1.0	1.1	1.3				
31	1.3					1.3		

[a] From old gage read previous to May 19. See remarks under "Accuracy" in station description.

Daily discharge, in second-feet, of Utica Gold Mining Co.'s canal near Avery, Cal., for the year ending Sept. 30, 1915.

Day.	May.	June.	July.	Aug.	Sept.	Day.	May.	June.	July.	Aug.	Sept.
1		88	78	57	74	16		88	[a] 78	[a] 70	[a] 70
2		88	78	57	[a] 74	17		[a] 88	78	70	70
3		88	78	57	74	18		88	[a] 78	[a] 70	[a] 70
4		88	[a] 78	57	[a] 72	19	88	[a] 88	78	70	70
5		[a] 88	78	57	70	20	88	88	78	70	70
6		88	[a] 78	57	[a] 70	21	88	[a] 88	[a] 78	[a] 71	[a] 70
7		88	78	67	70	22	[a] 88	88	78	72	70
8		88	78	[a] 67	[a] 70	23	88	[a] 88	[a] 78	[a] 73	[a] 70
9		88	[a] 78	67	70	24	88	88	78	74	70
10		88	78	[a] 67	[a] 70	25	[a] 88	[a] 88	[a] 78	[a] 74	[a] 64
11		88	[a] 78	67	70	26	88	88	78	74	57
12		88	78	[a] 68	[a] 70	27	88	[a] 83	[a] 78	[a] 74	57
13		88	[a] 78	70	70	28	88	78	78	74	[a] 53
14		88	78	[a] 70	[a] 70	29	88	78	[a] 78	[a] 73	49
15		88	[a] 78	70	70	30	[a] 88	78	78	72	49
						31	88		78	72	

[a] Interpolated.

Note.—Discharge determined from a well-defined rating curve.

Monthly discharge of Utica Gold Mining Co.'s canal near Avery, Cal., for the year ending Sept. 30, 1915.

Month.	Discharge in second-feet.			Run-off (total in acre-feet).	Accuracy.
	Maximum.	Minimum.	Mean.		
May 19-31	88	88	88.0	2,270	B.
June	88	78	86.8	5,160	B.
July	78	78	78.0	4,800	B.
August	74	57	68.0	4,180	B.
September	74	49	67.4	4,010	B.
The period				20,400	

SOUTH FORK OF STANISLAUS RIVER AT STRAWBERRY,[1] CAL.

Location.—In the SE. ¼ sec. 17, T. 4 N., R. 18 E., at site of former Sonora-Bridgeport State highway bridge at Strawberry, Tuolumne County, a summer resort in Stanislaus National Forest, 1½ miles below mouth of Herring Creek, and 15 miles northeast of Confidence.

Drainage area.—About 54 square miles.

Records available.—October 20, 1911, to September 30, 1915.

Gage.—Vertical staff on left bank fastened to abutment of former bridge about 30 feet upstream from suspension footbridge. Gage read twice a day by an employee of the Sierra & San Francisco Power Co. Original gage, located at same place, was torn out when bridge was removed, August 31, 1914. A temporary gage was used till October 10 and the old gage reinstalled October 14. Original datum has probably not been maintained.

Discharge measurements.—Made from suspension footbridge or by wading.

Channel and control.—Gravel and boulders; appear permanent. Left bank is about 20 feet high; right bank is lower, but probably is not subject to overflow.

Extremes of discharge.—Maximum stage recorded during year, 5.4 feet at 4 p. m. June 8 (discharge, 1,450 second-feet); minimum stage recorded, 0.70 foot November 26 to December 6 (discharge, 5.0 second-feet).

1911–1915: Maximum stage recorded, 5.4 feet at 4 p. m. June 8, 1915 (discharge, 1,450 second-feet); minimum stage recorded, 1.15 feet November 2 and 3, 1912 (discharge, 3 second-feet).

Winter flow.—Stage-discharge relation probably slightly affected by ice.

Diversions.—None above.

Regulation.—The flow is partially regulated by three reservoirs which have been constructed above the station to supply Tuolumne and Sonora with water for domestic use. This water is diverted about 10 miles below the station.

Accuracy.—Results good.

Cooperation.—Gage-height record furnished by Sierra & San Francisco Power Co., through H. F. Jackson, general manager.

Discharge measurements of South Fork of Stanislaus River at Strawberry, Cal., during the year ending Sept. 30, 1915.

Date.	Made by—	Gage height.	Discharge.	Date.	Made by—	Gage height.	Discharge.
		Feet.	*Sec.-ft.*			*Feet.*	*Sec.-ft.*
July 22	Oakdale irrigation district	1.8	79	Aug. 6	Oakdale irrigation district	1.4	38
23	H. D. McGlashan	1.45	29	8	Sierra & San Francisco Power Co	1.4	35
30	Oakdale irrigation district	1.5	41	Sept. 17	.....do	.90	9.1

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[1] Formerly published as "near Confidence."

Daily discharge, in second-feet, of South Fork of Stanislaus River at Strawberry, Cal., for the year ending Sept. 30, 1915.

Day.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.
1	27	26	5.0	48	109	48	109	215	1,230	530	28	48
2	19	24	5.0	61	91	68	118	127	1,120	530	28	46
3	18	24	5.0	75	91	48	146	127	965	530	28	39
4	16	24	5.0	83	83	48	190	127	865	512	28	38
5	16	24	5.0	75	100	48	190	146	915	442	28	37
6	14	24	5.0	75	48	48	190	156	1,020	265	28	35
7	12	24	5.5	75	48	48	167	190	1,230	265	28	23
8	8.8	22	6.0	75	54	48	167	240	1,450	265	28	7.2
9	8.8	20	8.0	109	61	61	167	252	1,230	295	24	7.1
10	8.8	20	8.0	109	75	61	178	325	1,120	295	24	6.6
11	8.3	28	8.0	91	75	48	228	460	1,020	295	24	6.4
12	7.8	58	14	91	75	48	280	530	820	265	24	6.4
13	7.3	48	20	91	91	48	325	512	650	265	22	6.5
14	6.8	46	20	109	83	75	215	408	650	265	20	6.5
15	5.5	42	20	75	48	83	240	340	730	240	20	7.1
16	5.5	35	28	48	61	91	295	460	820	240	22	5.5
17	5.5	17	37	37	75	109	408	570	730	215	42	5.5
18	7.2	9.0	37	42	75	127	495	460	820	190	49	6.2
19	48	5.5	37	48	61	146	570	390	775	127	48	6.0
20	75	5.5	37	61	61	178	610	310	730	102	48	6.0
21	37	5.5	37	75	61	190	570	228	730	78	42	6.0
22	20	5.5	37	48	61	202	512	265	730	53	42	6.0
23	17	5.5	37	42	61	215	390	372	730	28	42	6.0
24	14	5.5	61	48	48	215	810	390	730	28	40	5.9
25	14	5.5	48	48	48	252	240	355	650	28	40	5.9
26	12	5.0	48	37	48	215	240	390	570	28	49	5.7
27	10	5.0	42	54	48	190	252	730	530	28	51	5.6
28	9.6	5.0	37	109	48	190	355	775	570	28	51	5.5
29	8.0	5.0	42	127	......	190	325	820	570	28	51	5.5
30	20	5.0	48	109	......	190	295	1,020	570	28	51	5.5
31	22	......	48	91	......	167	......	1,120	......	28	51	......

NOTE.—Discharge determined from a rating curve fairly well defined below 900 second-feet. Discharge Oct. 1–10 estimated from stage record from temporary gage, and an estimate of discharge of 32 second-feet for a stage of 1.8 feet, made by Sierra & San Francisco Power Co. Discharge Oct. 11–13 and July 20–22 interpolated.

Monthly discharge of South Fork of Stanislaus River at Strawberry, Cal., for the year ending Sept. 30, 1915.

Month.	Discharge in second-feet.			Run-off (total in acre-feet).	Accuracy.
	Maximum.	Minimum.	Mean.		
October	75	5.5	16.4	1,010	D.
November	58	5.0	19.3	1,150	C.
December	61	5.0	25.8	1,590	C.
January	127	37	73.1	4,490	B.
February	109	48	67.4	3,740	B.
March	252	48	119	7,320	B.
April	610	109	293	17,400	B.
May	1,120	127	413	25,400	B.
June	1,450	530	842	50,100	B.
July	530	28	210	12,900	B.
August	51	20	35.5	2,180	C.
September	48	5.5	13.6	809	C.
The year	1,450	5.0	177	128,000	

SOUTH SAN JOAQUIN CANAL[1] NEAR KNIGHTS FERRY, CAL.

LOCATION.—At footbridge three-fourths mile below headgate at Goodwin dam on Stanislaus River, 4 miles above Knights Ferry, Stanislaus County.

RECORDS AVAILABLE.—May 1, 1914, to September 30, 1915. Also miscellaneous measurements and roughly approximate estimates for 1913.

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[1] Also known as Main Supply canal.

Gage.—Inclined staff on right bank fastened to the concrete lining, read until February 28, 1915. A vertical staff installed in a gage well on left bank was used after March 12, 1915. This gage is 100 feet above the old gage and probably at the same datum. Gage read twice a day by Griffin Morrison.

Discharge measurements.—Made from footbridge at gage.

Channel and control.—Canal has trapezoidal section and is concrete lined.

Extremes of discharge.—1914–15: Maximum stage recorded, 8.2 feet June 23, 1915 (discharge, 871 second-feet); no flow several periods each year.

Accuracy.—Results excellent. Rating curves well defined.

Cooperation.—Daily gage-height record furnished by South San Joaquin irrigation district through A. Griffin, chief engineer.

The water is used for irrigation in the Oakdale and South San Joaquin districts. South San Joaquin canal is on the right bank of the river.

Discharge measurements of South San Joaquin canal near Knights Ferry, Cal., during the year ending Sept. 30, 1915.

[Made by Charles Leidl.]

Date.	Gage height.	Discharge.	Date.	Gage height.	Discharge.	Date.	Gage height.	Discharge.
	Feet.	*Sec.-ft.*		*Feet.*	*Sec.-ft.*		*Feet.*	*Sec.-ft.*
May 23	5.25	490	May 23	3.81	318	May 23	2.20	128
23	6.24	616	23	1.00	36	23	3.16	237

Daily discharge, in second-feet, of South San Joaquin canal near Knights Ferry, Cal., for the year ending Sept. 30, 1915.

Day.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.
1	162	......	9	......	......	......	243	507	559	793	327	195
2	162	......	9	......	......	......	291	533	598	793	303	207
3	162	......	9	......	......	......	291	585	624	396	303	207
4	162	......	9	......	......	......	291	611	624	110	303	207
5	162	......	9	223	......	......	291	611	611	585	315	207
6	162	......	9	223	......	......	291	611	611	741	291	195
7	162	......	9	223	......	......	291	611	611	741	291	196
8	162	......	9	223	......	......	291	611	598	741	291	195
9	162	......	9	223	......	......	291	611	806	741	241	207
10	162	......	8	223	......	......	291	624	806	741	219	195
11	162	......	65	223	......	......	291	559	819	741	231	195
12	162	......	......	223	......	128	303	483	793	741	231	219
13	162	......	......	223	......	183	303	495	806	741	231	195
14	162	......	......	223	......	183	291	483	806	741	219	207
15	162	......	......	223	......	195	291	483	806	741	219	207
16	192	......	......	......	......	195	291	483	819	741	303	351
17	236	14	......	......	......	195	291	495	832	741	183	219
18	258	14	......	......	......	195	291	495	832	741	195	219
19	258	14	......	......	......	195	363	483	832	728	195	219
20	269	14	......	......	......	219	471	483	832	728	219	207
21	280	14	......	......	......	243	483	483	832	728	219	207
22	349	14	......	......	......	114	483	483	819	715	207	219
23	269	14	......	......	......	114	483	483	871	741	195	207
24	247	9	......	......	......	231	471	495	819	741	196	207
25	247	5	......	......	......	160	411	483	793	728	196	207
26	247	5	......	......	......	96	128	447	793	611	207	219
27	247	5	......	......	......	183	219	507	793	520	195	207
28	247	5	......	54	134	195	363	483	793	435	195	207
29	144	9	......	284	......	195	447	483	793	411	207	207
30	......	9	......	......	......	183	459	546	793	339	195	207
31	......	......	......	......	......	183	......	559	......	327	195	......

Note.—Discharge determined from three well-defined rating curves applicable Oct. 1–29, Nov. 17 to Feb. 28, and Mar. 12 to Sept. 30. Canal dry Oct. 30 to Nov. 16, Dec. 12 to Jan. 4, Jan. 16–27, Jan. 30 to Feb. 27 and Mar. 1–11.

Monthly discharge of South San Joaquin canal near Knights Ferry, Cal., for the year ending Sept. 30, 1915.

Month.	Discharge in second-feet.			Run-off (total in acre-feet).	Accuracy.
	Maximum.	Minimum.	Mean.		
October	349	0	191	11,700	A.
November	14	0	4.8	286	B.
December	65	0	5.0	307	B.
January	284	0	90.0	5,530	B.
February	134	0	4.8	267	......
March	243	0	116	7,130	A.
April	483	128	333	19,800	A.
May	624	447	526	32,300	A.
June	871	559	757	45,000	A.
July	793	110	647	39,800	A.
August	327	183	236	14,500	A.
September	351	195	211	12,600	A.
The year	871	0	262	189,000	

OAKDALE CANAL[1] NEAR KNIGHTS FERRY, CAL.

Location.—At footbridge 800 feet below headgate at Goodwin Dam on Stanislaus measurements and roughly approximate estimates for 1913.

Records available.—May 3, 1914, to September 30, 1915. Also miscellaneous measurements and roughly approximate estimates for 1913.

Gage.—Vertical staff in stilling well on left bank installed May 23, 1915; before that date the gage was a vertical staff [2] on left side of canal at same site and datum; read twice a day by E. C. Pearson.

Discharge measurements.—Made from footbridge at gage.

Channel and control.—Canal has trapezoidal section and side walls are concrete.

Extremes of discharge.—Maximum stage recorded during year and period 1914–15: 3.05 feet at 7 a. m. July 28, 1915 (discharge, 181 second-feet); no flow during periods of each year.

Accuracy.—Results good.

Coöperation.—Daily gage-height record furnished by Oakdale irrigation district through Burton Smith, chief engineer.

The water is used for irrigation in the Oakdale district. Oakdale canal is on the left bank of the river.

Discharge measurements of Oakdale canal near Knights Ferry, Cal., during the year ending Sept. 30, 1915.

[Made by Charles Leidl.]

Date.	Gage height.	Discharge.	Date.	Gage height.	Discharge.	Date.	Gage height.	Discharge.
	Feet.	*Sec.-ft.*		*Feet*	*Sec.-ft.*		*Feet.*	*Sec.-ft.*
May 23	2.35	109	June 9	0.83	23	Aug. 27	1.28	41
23	3.41	163	9	1.00	31	27	.51	3.7
23	.80	17.2	Aug. 27	1.62	63	27	.88	17.1
23	1.46	62	27	1.25	39			

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[1] Also known as South Main canal.

[2] Description of gage in Water-Supply Paper 391, p. 188, is in error. Records May 3 to Sept. 30, 1914, refer to the vertical staff gage.

Daily discharge, in second-feet, of Oakdale canal near Knights Ferry, Cal., for the year ending Sept. 30, 1915.

Day.	Oct.	Dec	Jan.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.
1	64	....	31	....	0.0	0.0	0.0	170	140	71
2	66	....	31	....	90	.0	.0	170	123	74
3	66	....	31	....	90	31	120	170	129	77
4	61	....	31	....	92	87	153	170	117	74
5	58	....	15.6	....	90	87	153	170	112	77
6	61	....	....	....	90	90	153	164	106	71
7	61	....	....	....	76	106	65	170	103	65
8	66	....	....	....	65	103	153	170	100	71
9	66	....	....	....	65	103	.0	170	71	71
10	64	....	....	....	65	106	153	170	88	65
11	66	....	....	....	65	103	153	170	88	71
12	61	....	....	....	65	98	153	170	88	82
13	61	....	....	....	65	103	170	.0	85	71
14	64	....	....	....	65	101	170	.0	82	82
15	61	....	....	....	65	101	170	.0	74	80
16	....	....	....	....	65	103	170	.0	65	77
17	....	....	....	....	87	103	170	.0	68	77
18	....	....	....	....	90	103	170	.0	77	77
19	....	....	....	31	90	101	170	.0	77	85
20	....	....	....	87	90	101	170	7.5	82	77
21	....	....	....	87	87	103	170	13.2	74	71
22	....	....	....	90	87	103	170	16.0	71	71
23	....	....	....	87	87	103	170	85	71	71
24	....	....	....	87	87	103	170	164	74	71
25	....	15.6	....	87	87	106	170	164	65	74
26	....	28	....	87	87	120	170	146	71	77
27	....	31	....	87	87	131	170	135	65	68
28	....	31	....	87	87	131	170	175	77	71
29	....	31	....	87	.0	131	170	158	77	77
30	....	31	....	.0	.0	131	170	135	65	77
31	....	31	....	.0	....	131	....	140	71	....

NOTE.—Discharge determined from three rating curves as follows: Oct. 1-15, well defined; Dec. 25 to July 12, fairly well defined; and July 20 to Sept. 30, well defined between 3 and 70 second-feet. Canal dry Oct. 16 to Dec. 24 and Jan. 6 to Mar. 18.

Monthly discharge of Oakdale canal near Knights Ferry, Cal., for the year ending Sept. 30, 1915.

Month.	Discharge in second-feet.			Run-off (total in acre-feet).	Accuracy.
	Maximum.	Minimum.	Mean.		
October	66	0.0	30.5	1,880	A.
November	0	.0	.00	0	
December	31	.0	6.41	394	C.
January	31	.0	4.50	277	C.
February	0	.0	.00	0	
March	90	.0	29.2	1,800	B.
April	92	.0	72.2	4,300	B.
May	131	.0	97.5	6,000	B.
June	170	.0	144	8,570	B.
July	175	.0	109	6,700	A.
August	140	65	85.7	5,270	A.
September	85	65	74.1	4,410	A.
The year	175	.0	54.6	39,600	

CALAVERAS RIVER AT JENNY LIND, CAL.

Location.—In the SE. ¼ sec. 22, T. 3 N., R. 10 E., at highway bridge on Milton road about one-fourth mile southeast of Jenny Lind, Calaveras County, and 27 miles above junction with San Joaquin River. North and South forks unite about 15 miles above station.

Drainage area.—395 square miles.

Records available.—January 1 to June 30, 1907; December 1, 1907 to June 30, 1908; and November 1, 1908, to September 30, 1915.

Gage.—Vertical staff in two sections; high-water section is on downstream end of middle pier of bridge; low-water section is underneath bridge on right bank. Gage read once a day by P. F. Sinclair.

Discharge measurements.—Made from bridge at gage or by wading.

Channel and control.—Composed of gravel and small boulders; shifts during high water. Banks not subject to overflow.

Extremes of discharge.—Maximum stage recorded during year, 4.4 feet at 4 p. m. February 2 (discharge, 9,190 second-feet); no flow October 1 to 12 and August 5 to September 9.

1907–1915: Maximum stage recorded, 14 feet January 31, 1911 (discharge, 69,600 second-feet); no flow July 22 to November 17, 1913; October 1 to 12, 1914, and August 5 to September 9, 1915.

Diversions.—None.

Regulation.—A small amount of storage is developed at Salt Springs Valley for use in connection with dredging operations below Jenny Lind.

Accuracy.—Results only fair on account of changes in the control and uncertainties, at times, in the gage height record.

Cooperation.—Gage-height record during the high-water season, December to June, is furnished by the United States Weather Bureau through N. R. Taylor, local forecaster.

Discharge measurements of Calaveras River at Jenny Lind, Cal., during the year ending Sept. 30, 1915.

Date.	Made by—	Gage height.	Discharge.	Date.	Made by—	Gage height.	Discharge.
		Feet.	*Sec.-ft.*			*Feet.*	*Sec.-ft.*
Feb. 3	R. C. Rice	2.91	4,430	Feb. 12	R. C. Rice	1.88	1,530
9	do	3.13	5,040	Apr. 18	Charles Leidl	.10	170
10	do	2.89	4,450	June 7	H. J. Tompkins	−.51	88
10	do	4.22	9,110	7	do	−.51	84
10	do	4.33	8,280	July 9	do	−.85	28
11	do	2.84	3,130				

Daily discharge, in second-feet, of Calaveras River at Jenny Lind, Cal., for the year ending Sept. 30, 1915.

Day.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.
1	......	200	340	240	8,420	580	335	140	200	20	5.9	......
2	......	200	340	240	7,370	580	335	140	166	20	5.9	......
3	......	200	680	340	5,820	510	285	140	136	20	5.9	......
4	......	200	680	600	2,610	510	285	140	110	20	5.9	......
5	......	200	600	400	1,140	510	285	140	88	20	......	......
6	......	200	600	400	1,140	450	240	140	70	20	......	......
7	......	240	530	400	1,040	450	240	140	70	20	......	......
8	......	240	460	530	1,040	450	240	140	70	5.9	......	......
9	......	290	340	940	7,370	390	200	140	70	5.9	......	......
10	......	290	340	600	6,110	390	200	140	70	5.9	......	6
11	......	290	460	600	3,260	390	200	140	52	5.9	......	6
12	......	340	460	600	1,900	335	200	140	52	5.9	......	6
13	290	340	340	460	1,000	335	200	140	52	5.9	......	6
14	290	340	340	460	730	335	170	140	52	5.9	......	6
15	290	340	340	460	580	285	170	140	52	5.9	......	6
16	290	340	340	460	510	285	170	140	52	5.9	......	6
17	240	340	340	340	510	285	170	140	52	5.9	......	6
18	240	340	340	340	1,820	285	140	586	52	5.9	......	6
19	240	340	340	340	1,210	285	140	442	52	5.9	......	6
20	240	340	340	290	900	285	140	238	52	5.9	......	6
21	240	340	340	290	1,430	240	140	238	52	5.9	......	6
22	200	340	240	240	1,430	240	140	238	36	5.9	......	6
23	200	340	240	240	1,320	240	140	238	36	5.9	......	6
24	200	340	240	240	1,100	240	140	238	36	5.9	......	6
25	200	340	240	200	900	240	140	238	36	5.9	......	6
26	200	340	240	200	730	240	140	238	36	5.9	......	6
27	200	340	240	200	580	240	140	238	20	5.9	......	6
28	200	340	240	4,700	580	390	140	238	20	5.9	......	6
29	200	340	240	2,450	......	390	140	238	20	5.9	......	6
30	200	340	240	1,720	......	335	140	238	20	5.9	......	6
31	200	......	240	2,150	......	335	......	238	......	5.9	......	......

NOTE.—Discharge determined from four rating curves as follows: Oct. 1 to Jan. 27, fairly well defined below 7,000 second-feet; Jan. 28 to Feb. 10, well defined between 3,500 and 6,000 second-feet; Feb. 11 to May 17, fairly well defined; and May 18 to Sept. 30, fairly well defined below 150 second-feet. No flow Oct. 1-12 and Aug. 5 to Sept. 9. Discharge, Sept. 10-30, estimated.

Monthly discharge of Calaveras River at Jenny Lind, Cal., for the year ending Sept 30, 1915.

[Drainage area, 395 square miles.]

Month.	Discharge in second-feet.				Run-off.		Accuracy.
	Maximum.	Minimum.	Mean.	Per square mile.	Depth in inches on drainage area.	Total in acre-feet.	
October	290	0.0	141	0.357	0.41	8,670	B.
November	340	200	300	.759	.85	17,900	B.
December	680	240	364	.922	1.06	22,400	B.
January	4,700	200	699	1.77	2.04	43,000	B.
February	8,420	510	2,230	5.65	5.88	124,000	B.
March	580	240	357	.904	1.04	22,000	B.
April	335	140	192	.486	.54	11,400	B.
May	586	140	202	.511	.59	12,400	C.
June	200	20	62.7	.159	.18	3,730	C.
July	20	5.9	9.08	.023	.03	558	C.
August	5.9	.0	.76	.0019	.002	47	D.
September	6	.0	4.20	.011	.01	250	
The year	8,420	.0	368	.932	12.63	266,000	

MOKELUMNE RIVER NEAR CLEMENTS, CAL.

Location.—In the NW. ¼ sec. 15, T. 4 N., R. 8 E., at highway bridge about 1 mile north of Clements, San Joaquin County. Cosumnes River enters about 19½ miles below the station. The North and Middle forks of the Mokelumne unite about 35 miles above Clements.

Drainage area.—642 square miles.

Records available.—October 28, 1904, to September 30, 1915.

Gage.—Staff in four sections at bridge; No. 1 is vertical and fastened to pile on right bank; No. 2 is inclined, directly back of No. 1; No. 3 is vertical and bolted to middle pier near downstream end; No. 4 is vertical and bolted to left abutment near downstream end. Gage read twice a day by Mrs. J. S. Hodges.

Discharge measurements.—Made from bridge at gage, or by wading.

Channel and control.—Sand and gravel; somewhat shifting. Right bank high and not subject to overflow. Left bank is overflowed above stage 15 feet for a distance of 200 feet.

Extremes of discharge.—Maximum stage recorded during year, 12.3 feet at 6 a. m. June 8 and 6.30 a. m. June 9 (discharge, 8,290 second-feet); minimum stage recorded, 2.8 feet at 6.30 a. m. August 30 (discharge, 55 second-feet).

1904–1915: Maximum stage recorded, 17.45 feet January 30, 1911 (discharge, 16,700 second-feet); minimum stage recorded, 2.5 feet, October 3 to 5, 1912 (discharge, 23 second-feet).

Diversions.—Several small ditches divert water for mining and irrigation above the station. Power is developed on the North Fork and part of the water is diverted outside of the drainage basin.

Regulation.—Flow is partly regulated by storage developed on the headwaters of the North Fork.

Accuracy.—Results good. Rating curves fairly well defined.

Discharge measurements of Mokelumne River near Clements, Cal., during the year ending Sept. 30, 1915.

Date.	Made by—	Gage height.	Discharge.	Date.	Made by—	Gage height.	Discharge.
		Feet.	*Sec.-ft.*			*Feet.*	*Sec.-ft.*
Oct. 26	R. C. Rice	3.16	109	July 8	H. J. Tompkins	5.14	978
Feb. 4	do	5.79	1,290				

Daily discharge, in second-feet, of Mokelumne River near Clements, Cal., for the year ending Sept. 30, 1915.

Day.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.
1	125	205	145	145	2,280	1,020	1,260	1,810	7,750	1,800	157	94
2	125	145	145	115	2,980	860	1,400	1,520	6,180	1,800	143	83
3	125	235	235	135	2,040	805	1,660	1,400	4,950	1,720	172	83
4	125	205	282	335	1,200	750	1,810	1,260	3,860	1,520	129	94
5	100	180	282	205	915	700	1,660	1,400	4,390	1,380	116	94
6	125	168	282	265	778	700	1,520	1,400	5,430	1,250	116	94
7	125	168	205	220	700	625	1,400	1,520	6,310	1,010	104	94
8	125	145	220	355	725	625	1,520	1,810	6,700	1,010	94	94
9	125	155	205	375	3,540	650	1,460	1,960	6,440	1,010	68	94
10	135	135	265	220	2,620	650	1,520	3,840	5,790	1,010	76	94
11	125	135	282	220	1,520	625	1,810	4,400	5,070	900	83	94
12	100	135	282	205	1,140	600	2,120	5,100	3,660	872	83	94
13	115	125	168	168	915	625	2,530	6,630	3,000	790	68	94
14	115	125	145	575	778	625	2,120	4,170	3,180	713	76	83
15	115	125	145	550	700	750	1,880	3,540	3,860	664	83	83
16	115	100	125	300	700	860	1,960	4,620	4,060	548	76	116
17	135	115	300	220	1,140	1,020	2,890	5,220	3,460	439	83	116
18	115	115	220	155	1,880	1,140	3,540	4,620	3,460	439	94	116
19	115	115	155	168	1,460	1,080	3,840	3,740	3,270	376	94	116
20	145	115	600	168	1,400	1,020	4,060	3,160	2,750	356	83	83
21	168	115	168	155	1,330	1,080	3,340	2,890	2,660	336	83	116
22	220	115	145	155	1,200	1,020	3,160	2,800	3,000	277	76	116
23	168	100	145	145	1,080	1,260	2,890	2,980	3,090	296	68	116
24	155	115	155	145	1,020	1,400	2,360	3,540	2,420	222	83	129
25	145	125	180	125	915	1,460	2,120	3,160	2,260	188	83	143
26	115	100	125	145	915	1,400	1,960	2,980	1,940	258	83	129
27	115	92	168	220	750	1,260	1,810	4,620	1,800	240	83	129
28	125	100	135	1,080	1,200	1,400	2,620	6,350	1,800	222	83	157
29	135	115	155	915	....	2,120	2,530	6,090	1,940	188	76	143
30	180	108	145	860	....	1,520	2,440	5,340	1,940	172	68	129
31	145	....	145	805	....	1,330	....	6,090	....	157	94	....

NOTE.—Discharge determined from two rating curves as follows: Oct. 1 to June 1, fairly well defined, and June 2 to Sept. 30, fairly well defined below 1,500 second-feet.

Monthly discharge of Mokelumne River near Clements, Cal., for the year ending Sept. 30, 1915.

Month.	Discharge in second-feet.			Run-off (total in acre-feet).	Accuracy.
	Maximum.	Minimum.	Mean.		
October	220	100	132	8,120	B.
November	235	92	134	7,970	B.
December	600	125	205	12,600	B.
January	1,080	115	318	19,600	B.
February	3,540	700	1,350	75,000	B.
March	2,120	600	999	61,400	B.
April	4,060	1,260	2,240	133,000	B.
May	6,630	1,260	3,550	218,000	B.
June	7,750	1,800	3,880	231,000	B.
July	1,800	157	715	44,000	B.
August	172	68	92.8	5,710	B.
September	157	83	107	6,370	B.
The year	7,750	68	1,140	823,000	

MIDDLE FORK OF MOKELUMNE RIVER AT WESTPOINT, CAL.

LOCATION.—In sec. 10, T. 6 N., R. 13 E., above highway bridge 1 mile south of Westpoint, Calaveras County, 1¼ miles below mouth of Bear Creek and 3½ miles above juntion with the South Fork.

DRAINAGE AREA.—Not measured.

RECORDS AVAILABLE.—October 9, 1911, to September 30, 1915.

Gage.—Vertical staff in two sections, fastened to trees on right bank, 1,000 feet above bridge; read once a day by C. H. Spink.

Discharge measurements.—Made from car and cable half a mile above gage or by wading.

Channel and control.—Boulders and gravel; fairly permanent.

Extremes of discharge.—Maximum stage recorded during year, 6.6 feet during night of May 13 (discharge, 701 second-feet); minimum stage recorded, 2.74 feet at 5.45 p. m. September 9 (discharge, 5.0 second-feet).

1911–1915: Maximum stage recorded, 10.0 feet at 4 p. m. January 23, 1914 (discharge, 2,550 second-feet); minimum stage recorded, 2.48 feet at 1 p. m. August 15, 1913 (discharge, 2.8 second-feet).

Winter flow.—Stage-discharge relation may be slightly affected by ice.

Diversions.—Mokelumne Hill and Valley Springs ditch (capacity about 6 second-feet) diverts water about 2 miles above the station.

Regulation.—None.

Accuracy.—Results good.

Discharge measurements of Middle Fork of Mokelumne River at West Point, Cal., during the year ending Sept. 30, 1915.

Date.	Made by—	Gage height.	Discharge.	Date.	Made by—	Gage height.	Discharge.
		Feet.	*Sec.-ft.*			*Feet.*	*Sec.-ft.*
Oct. 27	R. C. Rice	2.83	6.4	June 5	H. J. Tompkins	4.42	133
June 3	H. J. Tompkins	4.52	144				

Daily discharge, in second-feet, of Middle Fork of Mokelumne River at West Point, Cal., for the year ending Sept. 30, 1915.

Day.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.
1	5.2	8.0	7.8	7.8	311	128	168	143	188	31	11	6.0
2	5.2	7.8	8.2	7.8	376	114	168	128	151	30	10	6.0
3	5.2	7.4	15	7.8	168	101	176	121	143	29	9.6	6.0
4	5.2	7.4	10	11	128	95	176	136	128	30	9.6	6.0
5	5.2	7.4	18	9.8	89	89	176	136	121	28	10	6.0
6	5.2	7.4	13	13	78	84	168	128	114	27	9.1	5.7
7	5.2	7.4	10	12	64	78	213	128	114	27	8.7	5.4
8	5.2	7.4	9.1	22	276	72	176	128	108	26	8.5	5.4
9	6.0	7.4	8.5	13	276	76	168	223	101	25	8.2	5.0
10	6.0	7.4	13	12	223	76	168	244	95	26	8.0	5.4
11	6.0	7.4	13	10	101	75	176	404	89	24	7.8	5.7
12	6.0	7.4	10	13	101	75	185	376	89	22	7.8	6.0
13	6.0	7.4	10	27	89	74	194	494	75	20	8.2	5.7
14	6.0	7.4	9.6	89	78	78	176	349	69	18	8.2	6.0
15	6.0	7.4	9.6	30	67	89	168	299	65	18	8.2	6.0
16	6.0	7.3	9.6	17	136	95	176	276	61	18	8.2	6.0
17	6.9	7.3	11	15	376	95	185	463	57	17	7.8	6.0
18	6.9	7.1	10	13	276	108	185	376	57	14	7.8	6.0
19	7.8	7.1	8.9	12	194	108	194	336	55	15	7.8	6.0
20	13	6.9	8.5	11	194	114	194	288	52	14	7.8	6.0
21	8.9	6.9	8.0	12	159	114	194	254	50	13	7.8	6.0
22	7.8	6.7	7.8	13	143	121	185	233	48	13	7.8	6.0
23	6.9	6.9	7.8	13	143	136	176	213	44	13	7.4	6.0
24	6.9	6.9	7.8	13	143	136	159	265	41	13	7.1	6.0
25	6.9	6.9	7.6	17	128	136	151	223	38	13	6.7	6.0
26	6.9	6.9	7.8	15	108	143	136	213	36	12	6.4	6.0
27	6.5	6.9	7.8	24	101	136	128	213	34	12	6.0	6.0
28	6.5	8.2	7.8	78	168	376	128	204	33	11	6.0	6.0
29	6.4	8.0	7.8	128		233	176	194	33	11	5.4	6.0
30	7.8	7.8	7.8	78		194	143	185	32	10	5.4	6.0
31	7.3		7.8	136		176		176		10	5.4	

Note.—Discharge determined from a rating curve well defined below 250 second-feet.

Monthly discharge of Middle Fork of Mokelumne River at West Point, Cal., for the year ending Sept. 30, 1915.

Month.	Discharge in second-feet.			Run-off (total in acre-feet).	Accuracy.
	Maximum.	Minimum.	Mean.		
October	13	5.2	6.55	403	B.
November	8.2	6.7	7.33	436	A.
December	18	7.6	9.63	592	A.
January	136	7.8	28.4	1,750	A.
February	376	64	168	9,330	B.
March	376	72	120	7,380	A.
April	213	128	172	10,200	A.
May	494	121	244	15,000	B.
June	138	32	77.4	4,610	A.
July	31	10	19.0	1,170	A.
August	11	5.4	7.86	483	A.
September	6.0	5.0	5.88	350	B.
The year	494	5.0	71.4	51,700	

SOUTH FORK OF MOKELUMNE RIVER NEAR RAILROAD FLAT, CAL.

Location.—In sec. 34, T. 6 N., R. 14 E., at Laidet ranch, about 5 miles above mouth of Licking Fork and 5 miles east of Railroad Flat, Calaveras County.

Drainage area.—Not measured.

Records available.—October 23, 1911, to September 30, 1915.

Gage.—Vertical staff fastened to alder tree on right bank, 100 feet above suspension footbridge; read twice a day by Florence Laidet.

Discharge measurements.—Made from cable 150 feet below gage or by wading.

Channel and control.—Composed of gravel and appear almost permanent.

Extremes of discharge.—Maximum stage recorded during year, 3.51 feet at 7.40 a. m., May 14 (discharge, 660 second-feet); minimum stage recorded, 1.07 feet at 3.10 p. m., October 14 (discharge, 6.4 second-feet).

1911–1915: Maximum stage recorded, 6.9 feet at 4.20 p. m., January 25, 1914 (discharge, 3,330 second-feet); minimum stage recorded, 1.10 feet, November 18, 1911 (discharge, 4 second-feet).

Winter flow.—Stage-discharge relation not affected by ice this year.

Diversions.—An irrigation and power ditch (capacity about 2 second-feet) diverts water at base of Blue Mountain, above station. Some water is also used for irrigation at Laidet ranch.

Regulation.—No information.

Accuracy.—Results good.

Discharge measurements of South Fork of Mokelumne River near Railroad Flat, Cal., during the year ending Sept. 30, 1915.

Date.	Made by—	Gage height.	Discharge.
		Feet.	*Sec.-ft.*
Oct. 27	R. C. Rice	1.11	7.6
June 4	H. J. Tompkins	2.08	106

Daily discharge, in second-feet, of South Fork of Mokelumne River near Railroad Flat, Cal., for the year ending Sept. 30, 1915.

Day.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.
1	6.6	11	9.4	10	175	125	175	150	138	42	18	11
2	7.0	9.7	10	9.4	295	115	175	150	125	42	15	10
3	7.3	9.1	19	10	338	115	190	138	105	42	14	9.8
4	7.0	8.2	12	14	275	105	190	125	105	44	14	9.2
5	7.3	8.2	16	13	240	98	205	138	98	42	13	9.2
6	7.0	8.2	12	14	240	87	175	138	98	40	13	8.6
7	7.0	7.6	10	14	240	80	175	138	90	36	14	8.6
8	7.6	7.0	11	15	258	76	175	150	87	34	13	9.2
9	7.9	7.6	11	14	315	76	162	222	82	34	14	8.6
10	7.6	8.2	16	14	382	76	175	315	79	32	13	8.6
11	7.6	7.9	18	14	240	76	175	450	76	30	13	9.2
12	7.0	7.6	16	15	90	76	190	405	73	29	13	9.8
13	6.8	7.3	14	21	82	77	205	600	71	30	14	8.6
14	6.6	7.6	11	73	76	82	190	628	67	28	13	8.6
15	7.0	7.9	10	28	76	90	175	428	63	30	14	8.6
16	6.8	7.9	11	27	105	105	175	338	61	26	13	8.6
17	7.3	8.2	14	25	240	115	205	405	63	26	13	7.5
18	9.4	8.2	11	21	360	125	240	360	61	23	13	7.5
19	8.2	7.6	10	21	275	125	240	315	56	23	13	7.8
20	14	8.2	10	18	240	125	240	275	56	21	12	7.5
21	9.4	7.6	9.4	14	175	125	240	222	52	21	13	7.2
22	7.0	7.6	9.4	12	125	138	258	205	51	21	12	7.2
23	7.0	7.6	9.7	11	125	138	258	222	51	20	12	7.2
24	6.6	7.6	10	10	125	150	205	275	49	21	13	7.8
25	7.0	7.6	9.7	15	115	150	190	222	51	20	12	10
26	6.8	8.2	9.7	14	105	138	190	190	51	20	10	8.6
27	7.0	8.2	10	22	105	138	205	175	49	19	9.8	8.6
28	7.3	9.4	9.4	105	125	275	205	175	44	18	9.8	8.6
29	7.6	9.7	9.4	115	....	222	190	162	42	20	9.8	8
30	10	9.4	9.4	105	....	190	162	162	42	20	9.2	7.8
31	9.7	....	10	150	....	175	....	150	....	20	9.8	....

NOTE.—Discharge determined from two rating curves as follows: Oct. 1 to May 14, well defined; May 15 to Sept. 30, well defined above 20 second-feet. Discharge, Sept. 16 and 17, estimated.

Monthly discharge of South Fork of Mokelumne River near Railroad Flat, Cal., for the year ending Sept. 30, 1915.

Month.	Discharge in second-feet.			Run-off (total in acre-feet).	Accuracy.
	Maximum.	Minimum.	Mean.		
October	14	6.6	7.69	473	B.
November	11	7.0	8.20	488	B.
December	19	9.4	11.5	707	B.
January	150	9.4	31.1	1,910	A.
February	382	76	198	11,000	A.
March	275	76	122	7,500	A.
April	258	162	198	11,800	A.
May	628	125	259	15,900	A.
June	138	42	71.2	4,240	A.
July	44	18	28.2	1,730	A.
August	18	9.2	12.7	781	B.
September	11	7.2	8.58	511	B.
The year	628	6.6	78.8	57,000	

LICKING FORK OF MOKELUMNE RIVER NEAR RAILROAD FLAT, CAL.

Location.—In the E ½ SE. ¼ sec. 26, T. 6 N., R. 14 E., at Mokelumne forest ranger station, 100 feet above mouth of Big Canyon Creek, and 6½ miles east of Railroad Flat, Calaveras County. Licking Fork joins the South Fork 6 miles below the station.

Drainage area.—Not measured.

Records available.—October 23, 1911, to September 30, 1915 (incomplete).

Gage.—Until June 3, 1915, vertical staff on left bank 300 feet above the ranger station. June 4, 1915, it was moved downstream 160 feet and spiked to an alder tree, 2 feet in diameter, on left bank, and with a new datum. Gage read once a day by rangers, Fowler or Lewis.

Discharge measurements.—Made from foot log near gage or by wading.

Channel and control.—Bed of channel composed of boulders and gravel is rough. Control for old gage shifted during high water and was easily obstructed with leaves and débris at low water. Control for new gage is much better and fairly permanent. Both banks high and not subject to overflow.

Extremes of discharge.—Maximum stage recorded during year, 1.28 feet (old gage) at 7.20 a. m. May 13 (discharge, 40 second-feet); minimum stage recorded, 1.81 feet (new gage) September 28 to 30 (discharge, 1.3 second-feet).

1911–1915: Maximum stage recorded, 2.4 feet January 25, 1914; minimum stage recorded, 0.25 foot June 1 to 10, 1914; discharge unknown.

Diversions.—An irrigation ditch (capacity of 1 second-foot) heads above the station.

Regulation.—None.

Accuracy.—Results fair for old gage and excellent for new gage.

Cooperation.—Gage-height record furnished by United States Forest Service.

Discharge measurements of Licking Fork of Mokelumne River near Railroad Flat, Cal., during the year ending Sept. 30, 1915.

Date.	Made by—	Gage height.[a]	Gage height.[b]	Discharge.
		Feet.	*Feet.*	*Sec.-ft.*
Oct. 28	Roger C. Rice		−0.08	1.7
June 4	H. J. Tompkins		.52	15
4	do.	2.59	.51	12

[a] New gage installed June 4, 1915.

[b] Old gage.

Daily discharge, in second-feet, of Licking Fork of Mokelumne River near Railroad Flat, Cal., for the year ending Sept. 30, 1915.

Day.	Oct.	Dec.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.
1				24	18	15	5.6	2.4	1.8
2				25	18	14	5.3	2.4	1.8
3				26	18	14	5.2	2.4	1.8
4				26	19	11	5.1	2.4	1.8
5				26	20	11	4.9	2.4	1.9
6				26	19	11	4.9	2.4	1.9
7				26	18	10	4.7	2.4	1.8
8				26	18	10	4.5	2.4	1.8
9		3.5		25	21	10	4.3	2.3	1.7
10				26	24	9.9	4.2	2.3	1.6
11				27	27	9.7	4.2	2.2	1.6
12				26	26	9.3	4.0	2.1	1.6
13				26	39	8.9	4.0	2.1	1.6
14				24	33	8.5	4.0	2.0	1.6
15				24	30	8.1	4.0	1.9	1.5
16				25	32	7.8	3.9	1.8	1.5
17				25	33	7.4	3.8	1.8	1.4
18				25	31	7.1	3.7	1.8	1.5
19				26	29	7.0	3.6	1.7	1.5
20				25	27	6.8	3.5	1.7	1.4
21				25	26	6.7	3.4	1.8	1.5
22				24	25	6.6	3.2	1.8	1.5
23				22	25	6.5	3.1	1.8	1.5
24			27	21	24	6.5	3.0	1.8	1.4
25			25	20	22	6.3	2.9	1.8	1.4
26			25	20	20	6.2	2.8	1.7	1.3
27			21	19	20	6.0	2.8	1.7	1.3
28	1.7		25	19	19	5.9	2.7	1.8	1.3
29			26	19	18	5.9	2.6	1.8	1.3
30			25	19	17	5.8	2.5	1.8	1.3
31			25		16		2.4	1.8	

NOTE.—Discharge determined from two rating curves as follows: Oct. 28 to June 3, fairly well defined below and poorly defined above 20 second-feet; June 4 to Sept. 30, well defined. No record Oct. 1 to Mar. 23.

Monthly discharge of Licking Fork of Mokelumne River near Railroad Flat, Cal., for the year ending Sept. 30, 1915.

Month.	Discharge in second-feet.			Run-off (total in acre-feet).	Accuracy.
	Maximum.	Minimum.	Mean.		
March 24-31	27	24	25.2	400	B.
April	27	19	23.9	1,420	C.
May	39	16	23.6	1,450	C.
June	15	5.8	8.63	514	B.
July	5.6	2.4	3.83	236	A.
August	2.4	1.7	2.02	124	A.
September	1.8	1.3	1.56	93	A.
The period				4,240	

NORTH FORK OF COSUMNES RIVER NEAR EL DORADO, CAL.

LOCATION.—In sec. 23, T. 9 N., R. 10 E., at suspension footbridge at Celio's ranch,[1] 4 miles above junction with Middle Fork and 5 miles south of El Dorado, El Dorado County. Martinez Creek enters about 1½ miles above the station.

DRAINAGE AREA.—Not measured.

RECORDS AVAILABLE.—August 13, 1911, to September 30, 1915.

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[1] "Kings Store" on map of Placerville quadrangle, U. S. Geological Survey.

Gage.—Staff in three sections on right bank at the bridge; read once a day by James Yates. A temporary gage at same location (datum 1.0 foot higher) was used August 13 to September 23, 1911.

Discharge measurements.—Made from bridge or by wading.

Channel and control.—Gravel and solid rock; appear permanent.

Extremes of discharge.—Maximum stage recorded during year, 9.0 feet at 2 p. m. February 2 (discharge, 2,550 second-feet); minimum stage recorded, 2.90 feet October 1 to 3 (discharge, 3.5 second-feet).

1911–1915: Maximum stage recorded, 14.2 feet, January 25, 1914 (discharge, 6,930 second-feet); minimum stage recorded, 2.85 feet, August 19 to September 9 and September 14 to 17, 1914 (discharge, 2 second-feet).

Winter flow.—Stage-discharge relation very slightly, if ever, affected by ice.

Diversions.—The J. J. Crawford ditch diverts water from Camp Creek, above the station. This is a small ditch, about 2 feet wide. The water is used for irrigation purposes below Placerville.

Regulation.—None.

Accuracy.—Rating curve, which is well defined except for extremely high and low water, has been applicable since July 1, 1912. Interpolated discharges did not come at critical times and have not affected the accuracy appreciably. Results good.

No discharge measurements were made at this station during the year ending September 30, 1915.

Daily discharge, in second-feet, of North Fork of Cosumnes River near El Dorado, Cal., for the year ending Sept. 30, 1915.

Day.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.
1	3.5	17	17	26	1,890	610	568	401	490	85	17	5.1
2	3.5	17	17	23	2,550	490	528	384	454	85	17	5.1
3	3.5	[a]17	49	23	1,140	384	568	368	418	78	17	[a]5.8
4	4.5	17	85	49	610	352	695	384	384	72	16	5.5
5	5.1	14	85	39	401	322	695	418	368	72	14	5.5
6	5.1	14	49	[a]44	322	293	695	337	384	66	12	5.5
7	5.1	11	44	49	266	[a]293	610	352	308	60	11	[a]5.3
8	5.5	11	39	114	695	293	652	368	352	[a]57	11	5.1
9	5.5	11	[a]44	99	1,080	280	652	368	322	54	11	4.5
10	5.5	11	49	72	1,820	293	610	2,030	322	49	11	4.5
11	5.5	11	49	54	830	308	652	1,890	322	49	11	4.5
12	5.5	11	39	85	490	293	695	1,830	293	49	11	4.5
13	5.5	11	30	72	384	280	695	1,820	293	44	11	4.5
14	5.5	11	30	490	322	293	652	1,680	206	39	11	4.5
15	5.5	11	39	266	[a]466	293	610	1,190	240	[a]36	11	5.1
16	[a]5.5	[a]12	39	130	610	384	652	1,190	215	34	11	5.1
17	5.5	[a]13	39	85	1,080	418	[a]674	1,360	215	30	9.9	5.1
18	8.2	[a]14	34	72	1,080	454	695	1,300	191	30	[a]9.0	5.1
19	14	[a]15	30	72	740	454	695	1,360	191	30	8.2	5.1
20	14	17	30	[a]63	925	490	740	975	169	30	6.6	4.5
21	26	14	26	54	610	528	652	875	169	26	5.5	4.5
22	23	11	23	54	[a]550	528	610	785	159	26	5.5	[a]4.5
23	23	11	[a]23	51	490	568	610	[a]830	149	26	5.5	4.5
24	17	11	[a]23	51	454	568	568	875	[a]140	23	5.5	4.5
25	11	11	23	51	418	[a]589	528	695	130	23	5.5	5.5
26	11	11	26	54	384	610	528	610	122	23	5.5	5.5
27	[a]11	11	30	54	352	695	454	610	114	20	5.5	5.5
28	11	11	30	203	695	1,420	418	610	99	[a]18	5.5	6.6
29	11	18	30	215	....	875	384	568	92	17	5.5	5.5
30	20	17	26	266	....	695	490	568	85	17	5.5	5.5
31	17	....	30	322	....	610	....	528	....	17	5.1	....

[a] Estimated from interpolated values.

Note.—Discharge determined from a rating curve well defined between 100 and 3,000 second-feet.

Monthly discharge of North Fork of Cosumnes River near El Dorado, Cal., for the year ending Sept. 30, 1915.

Month.	Discharge in second-feet.			Run-off (total in acre-feet).	Accuracy.
	Maximum.	Minimum.	Mean.		
October	26	3.5	9.76	600	D.
November	18	11	13.1	780	D.
December	85	17	36.4	2,240	C.
January	490	23	107	6,580	A.
February	2,550	266	795	44,200	A.
March	1,420	280	483	29,700	A.
April	740	384	609	36,200	A.
May	2,030	337	891	54,800	A.
June	490	85	251	14,900	A.
July	85	17	41.5	2,550	B.
August	17	5.1	9.57	588	D.
September	6.6	4.5	5.05	300	D.
The year	2,550	3.5	267	193,000	

COSUMNES RIVER AT MICHIGAN BAR, CAL.

Location.—In the NW. ¼ SE. ¼ sec. 36, T. 8 N., R. 8 E., at highway bridge at Michigan Bar, Sacramento County, 5½ miles southwest of Latrobe. The North and Middle forks unite 12 miles above the station.

Drainage area.—524 square miles.

Records available.—October 20, 1907, to September 30, 1915.

Gage.—Vertical staff on downstream end of bridge pier, near left bank; read twice a day by C. B. Ruman.

Discharge measurements.—Made from bridge at gage or by wading.

Channel and control.—Sand, gravel, and small boulders; fairly permanent. Point of zero flow is at gage height 1.4 feet ± 0.1 foot.

Extremes of discharge.—Maximum stage recorded during year, 7.5 feet at 5 p. m. February 2 (discharge, 8,200 second-feet); minimum stage recorded, 2.0 feet, September 1 to 7 (discharge, 6 second-feet).

1907–1915: Maximum stage recorded, 10.9 feet, January 31, 1911 (discharge, 22,400 second-feet); no flow July 25 to September 16, 1908.

Diversions.—Douglas and Enterprise ditches (combined capacity about 50 second-feet) divert from the Middle and South forks. The water is used for power, domestic, and irrigation purposes at Plymouth and vicinity. Slug Gulch ditch (capacity 7 or 8 second-feet) also diverts water from the Middle Fork when prior appropriations permit. Michigan Bar canal (capacity about 50 second-feet) heads on the main Cosumnes at Musicdale Creek. No record is available showing the amount of water diverted.

Accuracy.—No discharge measurements were made at this station during the year, but measurements made after September 30, 1915, indicate that there has been a change in the stage-discharge relation for stages below about 120 second-feet. Results excellent except those for October and November which are fair, and those for August and September which are good.

Daily discharge, in second-feet, of Cosumnes River at Michigan Bar, Cal., for the year ending Sept. 30, 1915.

Day.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.
1	6.5	33	34	68	4,470	1,220	1,050	850	1,050	192	29	6
2	6.5	35	35	68	5,920	1,050	1,050	760	950	175	29	6
3	8	40	108	68	3,450	950	1,050	718	850	160	29	6
4	8	40	230	175	1,700	850	1,220	718	760	145	20	6
5	6.5	35	175	140	1,160	805	1,410	760	760	145	20	6
6	6.5	35	145	218	850	718	1,220	718	760	120	20	6
7	6.5	26	120	206	718	760	1,160	675	760	120	20	6
8	8	26	115	480	2,190	675	1,340	718	675	120	20	7.5
9	8	26	87	460	5,920	675	1,160	760	675	116	20	7.5
10	8	26	210	250	5,920	595	1,160	2,760	595	98	14	7.5
11	12	24	272	175	2,460	595	1,160	2,980	595	98	14	7.5
12	12	24	160	230	1,340	595	1,280	3,700	525	98	14	7.5
13	12	24	115	210	1,100	595	1,160	3,950	525	98	14	7.5
14	12	24	85	1,550	950	595	1,160	2,760	492	84	14	8.9
15	12	24	72	595	850	675	1,100	2,190	460	80	14	9
16	12	24	60	345	850	718	1,160	2,020	430	80	14	9
17	15	26	120	250	1,700	805	1,280	2,190	460	64	14	9
18	15	26	132	210	2,760	950	1,280	2,370	400	64	14	9
19	15	26	100	175	1,860	950	1,280	2,560	356	64	14	9
20	18	26	492	160	2,760	950	1,280	1,860	345	64	14	9
21	22	26	132	145	1,860	950	1,220	1,700	345	54	14	8
22	57	26	95	145	1,550	950	1,050	1,550	345	51	9	7.5
23	37	26	79	120	1,340	1,050	950	1,410	295	51	9	7.5
24	33	26	79	120	1,280	1,050	950	1,550	286	45	9	9
25	26	26	75	145	1,100	1,050	850	1,410	250	39	9	7.5
26	26	26	75	145	950	1,050	805	1,280	250	39	9	12
27	22	26	85	175	850	1,050	760	1,280	250	39	9	8.5
28	18	26	75	1,100	1,780	1,160	760	1,280	234	39	9	11
29	18	26	75	760	....	1,550	760	1,100	210	39	9	9
30	18	28	69	1,000	....	1,280	1,050	1,050	210	34	9	9
31	20	....	68	1,160	....	1,160	....	1,050	....	34	9	....

NOTE.—Discharge, Oct. 1 to July 8, determined from a rating curve well defined above and fairly well defined below 50 second-feet; curve used after July 8 well defined; curves identical above 120 second-feet.

Monthly discharge of Cosumnes River at Michigan Bar, Cal., for the year ending Sept. 30, 1915.

Month.	Discharge in second-feet.			Run-off (total in acre-feet).	Accuracy.
	Maximum.	Minimum.	Mean.		
October	57	6.5	16.3	1,000	C.
November	40	24	27.7	1,650	B.
December	492	34	122	7,500	A.
January	1,550	68	356	21,900	A.
February	5,920	718	2,130	118,000	A.
March	1,550	595	904	55,600	A.
April	1,410	760	1,100	65,500	A.
May	3,950	675	1,630	100,000	A.
June	1,050	210	503	29,900	A.
July	192	34	85.5	5,260	A.
August	29	9	15.0	922	B.
September	12	6	7.95	473	B.
The year	5,920	6	565	408,000	

GOOSE LAKE BASIN.

DREWS CREEK RESERVOIR NEAR LAKEVIEW, OREG.

LOCATION.—Dam is in the SE. ¼ sec. 5, T. 40 S., R. 18 E., about 14 miles southwest of Lakeview, Lake County; reservoir extends upstream about 10 miles.

RECORDS AVAILABLE.—February 26, 1913, to September 30, 1915; occasional readings.

GAGE.—Gage face attached to plank on upstream face of dam in 1915. Previous readings obtained by measuring down from the floor of gage house. Gage heights refer to a datum level with lowest contour of reservoir. Gage reader, R. J. Gilbert.

OUTLETS.—A tunnel with sill at elevation 16.3 feet and a blow-out pipe in center of dam at bottom.

REGULATION.—Reservoir was filled up to outlet tunnel during winter of 1911–12, but was practically empty October 1, 1912. The rate of filling between that date and March 31, 1913, has been estimated.

EXTREMES OF STAGE.—Maximum stage recorded during year, 41.3 feet October 3 (quantity stored, 18,480 acre-feet); minimum stage recorded, 24.4 feet September 28 (quantity stored, 1,560 acre-feet).

1913–1915: Maximum stage recorded, 53.4 feet April 18–20, 1914 (quantity stored, 55,500 acre-feet).

The following readings, near the end of each month, have been used in correcting the observed flow of Drews Creek below the dam:

Readings used in correcting observed flow of Drews Creek below dam during year ending Sept. 30, 1915.

Date.	Gage height.	Storage.	Loss or gain during month.	Date.	Gage height.	Storage.	Loss or gain during month.
	Feet.	*Acre-feet.*	*Acre-feet.*		*Feet.*	*Acre-feet.*	*Acre-feet.*
Oct. 31	41.3	18,480	....	May 29	36.0	9,310	+2,120
Jan. 30	39.0	14,000	a −4,480	July 3	34.8	7,780	−1,530
Feb. 27	35.7	8,920	−5,080	July 31	32.9	5,710	−2,070
Mar. 31	34.8	7,780	−1,140	Aug. 31	28.2	2,620	−3,090
Apr. 30	34.3	7,190	− 590	Sept. 28	24.4	1,560	−1,060

a Oct. 1 to Jan. 31.

DREWS CREEK NEAR LAKEVIEW, OREG.

LOCATION.—In the SW. ¼ sec. 4, T. 40 S., R. 18 E., at highway bridge about half a mile below mouth of Willow Creek, 1 mile below the Drews Creek dam, and 13 miles southwest of Lakeview, Lake County.

DRAINAGE AREA.—211 square miles.

RECORDS AVAILABLE.—January 16, 1909, to September 30, 1915.

GAGE.—Friez water-stage recorder since March 19, 1912, referred to a vertical staff on the highway bridge, installed March 1, 1910. Gage inspected by R. J. Gilbert. Inclined staff at station No. 1, at the dam site a mile above present gages, used January 16 to May 31, 1909, and vertical staff at station No. 2, at a dump-car bridge 100 feet below the dam site, November 20, 1909, to February 28, 1910.

DISCHARGE MEASUREMENTS.—Made from wagon bridge or by wading.

CHANNEL AND CONTROL.—Gravel and sand; shifts slightly: drift and growth of aquatic plants may collect on control occasionally, affecting stage-discharge relation. At highest stages water flows in a second channel.

EXTREMES OF DISCHARGE.—Maximum stage during year from water-stage recorder, 4.31 feet at 1 p. m. March 31 (discharge, 441 second-feet); minimum stage from water-stage recorder, 1.90 feet at 11 a. m. September 23 (discharge, 1 second-foot or less).

1909–1915: Maximum stage recorded, 8.3 feet January 16, 1909, on original gage (discharge, 2,730 second-feet). Creek dry at times.

WINTER FLOW.—Stage-discharge relation has not been affected by ice since water has been stored in reservoir, as the water flowing past the station comes from near the bottom of the reservoir and is well above the freezing point.

Diversions.—The North Drews canal of the Goose Lake Valley Irrigation Co. diverts water past the station. Record is kept of its discharge, and this is added to secure the total run-off from the creek.

Regulation.—Beginning with the last part of 1912, water has been stored in the reservoir of the Goose Lake Valley Irrigation Co., just above the station. A negligible quantity of water was stored prior to that time. The run-off records have been corrected for storage. The results are often negative during the summer as the discharge into the reservoir becomes too small to offset the evaporation losses.

Accuracy.—Results for 1915 only fair on account of shifting control and lack of sufficient measurements. Prior to construction of the dam, records were subject to considerable error on account of diurnal fluctuation.

Discharge measurements of Drews Creek near Lakeview, Oreg., during the year ending Sept. 30, 1915.

Date.	Made by—	Gage height.	Discharge.
		Feet.	*Sec.-ft.*
Dec. 8	James E. Stewart	2.18	12.1
May 8	P. V. Hodges	2.10	12.2

Daily discharge, in second-feet, of Drews Creek near Lakeview, Oreg., for the year ending Sept. 30, 1915.

Day.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May.	June.	Aug.	Sept.
1	26	23	....	16	15	47	409	12	12	....	10
2	26	23	....	13	60	46	412	12	12	....	5
3	26	24	....	11	96	52	412	12	12	....	4
4	25	25	....	11	84	52	402	12	12	....	4
5	25	24	....	11	54	52	399	12	12	....	....
6	24	23	....	11	50	52	394	12	13	....	....
7	24	23	....	11	50	52	329	12	14	....	....
8	24	23	12	12	48	62	267	12	14	....	....
9	25	23	....	11	50	76	238	12	15	....	....
10	25	23	....	11	48	76	210	12	16	....	....
11	25	23	....	11	46	75	164	12	16	....	....
12	25	23	....	11	47	75	134	12	16	....	....
13	25	23	....	10	49	78	24	12	17	....	....
14	25	22	....	11	47	82	21	12	17	....	....
15	25	22	....	11	46	92	22	12	17	....	....
16	24	21	....	11	46	120	22	12	17	....	....
17	24	....	16	11	47	158	22	12	17	....	....
18	24	....	16	11	47	181	14	12	17	....	....
19	25	....	16	11	48	212	14	12	18	....	....
20	24	....	16	11	48	253	13	12	17	....	....
21	24	....	15	10	48	326	13	12	7.2	....	....
22	24	....	15	10	48	334	12	12	4.8	....	....
23	24	....	15	10	48	347	13	12	....	....	....
24	24	....	16	10	48	399	12	12	....	....	....
25	24	....	16	10	48	381	12	12	....	70	....
26	25	....	16	10	47	425	12	12	....	140	....
27	25	....	16	10	47	425	12	12	....	130	....
28	24	....	16	10	47	425	12	12	....	130	....
29	24	....	16	10	....	417	12	12	....	114	....
30	24	....	16	10	....	415	12	12	....	35	....
31	23	....	16	10	....	407	....	12	....	31	....

Note.—Discharge determined as follows: Oct. 1 to Mar. 14, from a fairly well-defined rating curve; Mar. 15-20, by indirect method for shifting channels; Mar. 21 to June 22, from a fairly well-defined rating curve, which has also been used Aug. 25 to Sept. 4 after deducting 0.15 foot from observed gage readings to allow for probable backwater owing to growth of aquatic plants in channel. Mean discharge estimated as follows: Nov. 17-30, 17 second-feet; Dec. 1-7 and 9-16, 14 second-feet; June 23-30, 4 second-feet; Aug. 1-27, 2.5 second-feet; Sept. 5-30, 1.5 second-feet. Stage-discharge relation affected by growth of aquatic plants June 23 to Sept. 30, but flow may be safely assumed to have gradually decreased except Aug. 25 to Sept. 4, when water was released from the gates.

Monthly discharge of Drews Creek near Lakeview, Oreg., for the year ending Sept. 30, 1915.

Month.	Discharge in second-feet.			Run-off (total in acre-feet).	Accuracy.
	Maximum.	Minimum.	Mean.		
October	26	23	24.5	1,510	B.
November	25		20.2	1,200	C.
December			14.8	910	D.
January	16	10	10.9	670	B.
February	96	15	50.2	2,790	B.
March	425	46	200	12,300	B.
April	412	12	135	8,030	B.
May	12	12	12.0	738	B.
June	18		11.5	684	C.
July			[a] 3.0	184	D.
August	140		22.9	1,410	C.
September	10		2.1	125	C.
The year	425		42.2	30,600	

[a] Estimated.

NOTE.—Total run-off of Drews Creek for year, including North Drews Canal and deducting draft from reservoir, was 26,100 acre-feet.

NORTH DREWS CANAL NEAR LAKEVIEW, OREG.

LOCATION.—In sec. 3, T. 40 S., R. 18 E., nearly opposite the station on Drews Creek, about two miles below the intake of the canal at the Drews Creek dam and one-third mile above a spillway.

RECORDS AVAILABLE.—March 18, 1914, to September 30, 1915.

GAGE.—Vertical staff on right side of flume at station 107. A gage just below outlet gate of dam was also read during 1915. Gages read once a day by R. J. Gilbert.

DISCHARGE MEASUREMENTS.—Made from collar of flume or by wading.

CHANNEL AND CONTROL.—12-foot wooden flume. Practically all readings in 1914 were made when wasteway below gage was open.

EXTREMES OF DISCHARGE.—Maximum stage recorded during year, 1.85 feet April 10 (discharge, 76 second-feet); no flow August 9 and 10.

1914–15: Maximum discharge 102 second-feet (gage height, 2.10 feet on gage above weir) March 28, 1914. Canal dry at times.

ACCURACY.—Results fair except October to December, when they are poor on account of lack of gage records.

North Drews canal diverts from Drews Creek at reservoir dam in the SE. ¼ sec. 5. Water will be used for irrigation, but during 1915 most of it was wasted into creek below the gages on both canal and creek.

Discharge measurements of North Drews canal near Lakeview, Oreg., during the year ending Sept. 30, 1915.

Date.	Made by—	Gage height.	Discharge.
		Feet.	*Sec.-ft.*
Dec. 8	James E. Stewart	0.32	2.8
May 8	P. V. Hodges	[a] .40	4.3

[a] Reading on gage at dam, 0.00 foot.

Daily discharge, in second-feet, of North Drews canal near Lakeview, Oreg., for the year ending Sept. 30, 1915.

Day.	Dec.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.
1				28	62	4.0	4.6	10	10	14
2			41	23	62	4.2	4.6	10	10	16
3				27	62	4.3	4.6	10	10	16
4				27	62	4.3	10	10	10	16
5				27	62	4.3	10	11	10	16
6		24		35	58	4.3	4.3	11	10	16
7			41	45	58	4.3	4.3	11	10	15
8	3.0			50	53	4.3	4.3	12	10	15
9		24	32	53	43	4.4	4.3	12	0	15
10				53	76	4.6	4.3	12	0	14
11				53	74	4.6	6.3	12		14
12		23	28	53	53	4.6	8.2	12		14
13			29	53	18	4.6	2.7	12		14
14				59	46	4.6	2.7	12	19	14
15				65	46	4.6	2.7	12		12
16				57	46	4.6	4.3	12		6
17			29	71	46	4.6	5.5	11		6
18				66	28	4.6	5.5	13		6
19		23		66	9	4.6	5.5	13		7
20			29	33	8	4.6	10	15		8
21				33	7	4.6	10	14	19	8
22	16			33	6	4.6	10	15	19	8
23		23	29	38	5	4.6	10	10	32	8
24	28			60	4.3	4.6	10	10	46	8
25				55	4.2	4.6	10	8.5	35	8
26		23	30	66	4.0	4.6	8.5	10	23	8
27	28		29	66	4.0	4.6	8.5	10	23	8
28				66	4.0	4.6	8.5	10	23	8
29				66	4.0	4.6	10	10	23	8
30				66	4.0	4.6	10	10	18	7
31				62		4.6		10	13	

NOTE.—Discharge determined from readings on regular gage and a well-defined rating curve Dec. 8-27, Feb. 12, Feb. 27 to June 16, and Aug. 14 to Sept. 30; from readings on gage at dam and a fairly well-defined rating curve, January and February, except Feb. 12, 27-28, and June 17 to Aug. 8. A correction has been made for effect of growth of aquatic plants July 18 to Aug. 8. Mean discharge July 11-20 estimated as 19 second-feet.

Monthly discharge of North Drews canal near Lakeview, Oreg., for the year ending Sept. 30, 1915.

Month.	Discharge in second-feet.			Run-off (total in acre-feet).	Accuracy.
	Maximum.	Minimum.	Mean.		
October			[a] 2.0	123	D.
November			[a] 3.0	179	D.
December	28		10.3	633	C.
January	34		23.7	1,460	B.
February	41	29	32.4	1,800	B.
March	71	23	50.2	3,090	B.
April	76	4.0	34.0	2,020	B.
May	4.6	4.0	4.50	277	B.
June	10	2.7	6.81	405	C.
July	15	8.5	11.3	695	C.
August	46	0	17.5	1,080	C.
September	16	6.0	11.1	660	B.
The year	76	0	17.1	12,400	

[a] Estimated.

COTTONWOOD CREEK NEAR LAKEVIEW, OREG.

LOCATION.—In the SW. ¼ sec. 29, T. 38 S., R. 19 E., about half a mile below dam site of a proposed storage reservoir and near edge of valley, and 10 miles northwest of Lakeview, Lake County.

DRAINAGE AREA.—30 square miles.

Records available.—November 22, 1908, to September 30, 1915.

Gage.—Vertical staff on left bank; read once daily by Peter Segner. From November 22, 1908, to January 18, 1909, a gage just above a weir, one-fourth mile below the dam site, was used.

Discharge measurements.—Made from a footbridge 40 feet below the present gage or by wading near the gage.

Channel and control.—Clean gravel; somewhat shifting; stage of zero flow, −0.1±0.1 foot.

Extreme of discharge.—Maximum stage recorded during year, 2.2 feet March 23 and 27 (discharge, 149 second-feet); minimum stage recorded, 0.15 foot August 28 to September 9 (discharge, 1.5 second-feet).

1908–1915: Maximum stage recorded, 3.4 feet November 23, 1909 (discharge, 337 second-feet); minimum discharge of 1.0 second-foot has been noted in 1909, 1910, 1913, and 1914.

Winter flow.—Stage discharge relation seriously affected by ice; flow estimated.

Diversions.—At present no diversions above station.

Accuracy.—Results good except for period when stream was frozen and during spring, when there is a large diurnal fluctuation due to melting snow.

The following measurement was made by P. V. Hodges:

May 7, 1915: Gage height, 0.64 foot; discharge, 23.2 second-feet.

Daily discharge, in second-feet, of Cottonwood Creek near Lakeview, Oreg., for the year ending Sept. 30, 1915.

Day.	Oct.	Nov.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.
1	2.0	3.5	5.0	60	32	35	9.0	5.0	2.0
2	2.0	3.5	5.0	112	35	32	9.0	5.0	1.2
3	2.0	3.5	5.0	87	28	32	9.0	3.5	1.2
4	2.0	3.5	7.0	69	32	32	7.0	3.5	1.2
5	2.0	3.5	12	74	32	28	7.0	3.5	1.2
6	2.0	3.5	9.0	47	21	24	7.0	3.5	1.2
7	2.0	5.0	7.0	69	35	21	7.0	3.5	1.2
8	2.0	5.0	7.0	43	28	21	7.0	3.5	1.2
9	2.0	5.0	5.0	47	60	18	7.0	3.5	1.2
10	5.0	5.0	7.0	47	69	21	7.0	2.0	1.2
11	5.0	5.0	7.0	60	64	21	7.0	2.0	2.0
12	5.0	3.5	7.0	64	60	18	7.0	2.0	1.2
13	5.0	3.5	7.0	60	47	18	7.0	2.0	2.0
14	5.0	7.0	7.0	64	60	18	7.0	2.0	2.0
15	5.0	9.0	9.0	43	47	18	7.0	2.0	3.5
16	5.0	7.0	9.0	39	43	18	7.0	2.0	3.5
17	7.0	7.0	47	43	43	18	7.0	2.0	3.5
18	7.0	7.0	161	56	74	12	3.5	2.0	3.5
19	12	12	161	43	47	9.0	5.0	2.0	3.5
20	9.0	15	139	60	43	15	5.0	2.0	3.5
21	7.0	15	166	43	39	12	5.0	2.0	2.0
22	5.0	15	161	43	43	12	7.0	2.0	2.0
23	5.0	9.0	172	39	39	12	3.5	2.0	2.0
24	5.0	7.0	69	35	47	12	3.5	2.0	2.0
25	5.0	9.0	92	35	39	9.0	3.5	2.0	2.0
26	3.5	....	43	39	35	9.0	3.5	2.0	2.0
27	3.5	....	172	32	35	9.0	3.5	2.0	3.5
28	3.5	....	97	43	39	9.0	3.5	1.2	5.0
29	5.0	....	97	39	39	9.0	3.5	1.2	3.5
30	3.5	....	56	39	35	9.0	3.5	1.2	3.5
31	3.5	....	117	....	32	....	3.5	1.2	....

Note.—Discharge determined from a fairly well defined rating curve. Stage-discharge relation affected by ice about Nov. 26 to Feb. 28. Mean discharge estimated Nov. 26–30, 7 second-feet; Dec. 1–15, 5 second-feet; Dec. 16–25, 3 second-feet; Dec. 26 to Jan. 15, 5 second-feet; Jan. 16 to Feb. 28, 4 second-feet. Large diurnal fluctuation during parts of March and April; gage read alternately morning and evening.

Monthly discharge of Cottonwood Creek near Lakeview, Oreg., for the year ending Sept. 30, 1915.

Month.	Discharge in second-feet.			Run-off (total in acre-feet).	Accuracy.
	Maximum.	Minimum.	Mean.		
October	12	2.0	4.44	273	B.
November	15	3.5	6.9	411	C.
December	....	....	4.4	271	C.
January	....	....	4.5	277	C.
February	....	....	4.0	222	C.
March	172	5	60.2	3,700	C.
April	112	32	52.5	3,120	B.
May	74	21	42.6	2,620	B.
June	35	9	17.7	1,060	B.
July	9	3.5	5.87	361	B.
August	5	1.2	2.43	149	C.
September	5	1.2	2.31	137	C.
The year	172	1.2	17.4	12,600	

THOMAS CREEK NEAR LAKEVIEW, OREG.

Location.—In the NE. ¼ sec. 22, T. 38 S., R. 19 E., at site of proposed diversion dam, near edge of valley, about 8 miles below the Thomas Creek reservoir, and about 10 miles northwest of Lakeview, Lake County.

Drainage area.—Not measured.

Records available.—January 1, 1912, to September 30, 1915.

Gage.—Vertical staff driven in creek bed near left bank, 300 feet above highway bridge; read daily in flood periods and twice a week at other times by George Wright. Gage readings beginning April 13, 1914, refer to a datum 0.46 foot lower than that previously used. Gage used January 1 to March 9, 1912, and December 1, 1912, to February 29, 1913, was on right abutment of bridge over southernmost of three channels, into which creek divides at the road crossing.

Discharge measurements.—Made by wading at all but highest stages, when measurements may be made from the highway bridge at the old gage.

Channel and control.—Sand, gravel, and yellow clay; somewhat shifting.

Extremes of discharge.—Maximum stage recorded during year, 2.6 feet April 2 and 3 (discharge, 95 second-feet); minimum stage recorded, 1.28 feet July 6 (discharge, 0.8 second-foot).

1912–1915: Maximum stage recorded, 4.15 feet April 15, 1914 (discharge, 440 second-feet); minimum stage recorded, 1.28 feet July 6, 1915 (discharge, 0.8 second-foot).

Winter flow.—Stage-discharge relation not affected by ice owing to springs above the gage.

Diversions.—Two small irrigation ditches divert water around gage.

Accuracy.—Results only fair on account of unstable channel, diurnal fluctuation in the early spring, and infrequency of gage readings.

The following measurement was made by P. V. Hodges:

May 7, 1915: Gage height, 1.70 feet; discharge, 12.5 second-feet.

Daily discharge, in second-feet, of Thomas Creek near Lakeview, Oreg., for the year ending Sept. 30, 1915.

Day.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.
1					5.0	4.8	7.1	2.4				
2				4.0		4.7	9.5	2.2	13			
3						4.6	9.5	2.0	12	1.0		
4		2.4	3.4			4.6	7.0	1.8			1.2	2.0
5				4.0		4.6	4.4	1.7	11			
6					5.0	4.6	4.9	1.5		.8		
7		2.8				4.7	4.6	1.4				
8	3.0		3.4	4.0		4.8	4.4	1.2	6.9	1.0		2.2
9					5.0	5.0	4.0	1.8	7.5			
10						5.0	5.1	2.4		1.2	1.2	
11						5.0	5.0	3.0	7.5			2.2
12		3.0	4.0	4.6	5.0	5.0	4.9	3.5	5.1			
13						5.0	4.9	3.3		2.2		
14						6.2	3.3	4.0			1.2	2.2
15	3.0		4.0			7.4	3.8	3.3	5.1			
16				4.0	5.0	8.5	4.2	2.9		2.2		
17						10	4.2	2.5	2.2		1.2	
18		3.0				12	4.1	2.5				2.2
19			4.0	4.0		5.0	4.0	3.1	2.2			
20	5.0				5.0	11	4.4	2.5		2.2		
21	4.0					12	3.8	2.5	2.2		1.2	2.2
22						12	3.3	2.5				
23			3.4	4.0		21	2.9	2.6	2.2			2.2
24	2.8				5.0	24	2.7	2.7		1.6		
25						27	2.6	2.7			2.2	
26		3.4	3.4	4.6		39	2.5	2.5	1.2			
27					5.0	41	2.5	2.2		1.2		
28	2.4					54	2.5	1.8	1.6		2.0	
29			3.4	4.6		66	2.5	1.8				2.2
30		3.4				61	2.7	1.6		1.2		2.2
31	2.4					52		1.5			2.0	

NOTE.—Discharge determined from two fairly well defined rating curves applicable Oct. 1 to Mar. 31 and Apr. 1 to Sept. 30, respectively. Discharge interpolated Mar. 1–2, 4–5, 7–8, 10–12, 14–15, 17, 21, 24, 28, Apr. 4, 11, 15, 18, 25, May 2–3, 6–7, 9–11, 16, 23, 26, and 30.

Monthly discharge of Thomas Creek near Lakeview, Oreg., for the year ending Sept. 30, 1915.

Month.	Discharge in second-feet.			Run-off (total in acre-feet).	Accuracy.
	Maximum.	Minimum.	Mean.		
October	5.0	2.4	3.23	199	B.
November	3.4	2.4	3.00	179	B.
December	4.0	3.4	3.62	223	B.
January	4.6	4.0	4.20	258	B.
February	5.0	5.0	5.00	278	B.
March	66	4.6	17.1	1,050	C.
April	95	25	43.8	2,610	C.
May	40	12	23.7	1,460	B.
June	13	1.2	5.69	339	B.
July	2.2	.8	1.46	90	C.
August	2.2	1.2	1.52	93	C.
September	2.2	2.0	2.18	130	C.
The year	95	.8	9.54	6,910	

NOTE.—Mean monthly discharge obtained by averaging the daily discharge shown in table of daily discharge.

SACRAMENTO RIVER BASIN.

SACRAMENTO RIVER AT CASTELLA, CAL.

LOCATION.—In sec. 22, T. 38 N., R. 4 W., at private highway bridge at Castella; Shasta County, and about half a mile below the mouth of Castle Creek.

DRAINAGE AREA.—257 square miles.

RECORDS AVAILABLE.—October 15, 1910, to September 30, 1915.

GAGE.—Vertical staff on downstream end of bridge pier near right bank; read once a day by H. O. Wickes.

Discharge measurements.—Made from bridge at Sweet Brier camp, one-half mile below gage. This section is more satisfactory than the one at the highway bridge, where early measurements were made.

Channel and control.—Rough; composed of small boulders; fairly permanent.

Extremes of discharge.—Maximum stage recorded during year, 8.7 feet at 5 p. m. March 28 (discharge, 7,780 second-feet); minimum stage recorded, 2.4 feet at 7 a. m. October 28 and November 8 (discharge, 175 second-feet).

1910–1915: Maximum stage recorded, 13.7 feet at 5.50 a. m. January 2, 1914 (discharge, determined from extension of rating curve, 16,000 second-feet); minimum stage recorded, 2.4 feet at 7 a. m. October 28 and November 8, 1914 (discharge, 175 second-feet).

Diversions.—None.

Regulation.—None.

Accuracy.—Results good.

Cooperation.—Gage-height record furnished by H. O. Wickes.

Discharge measurements of Sacramento River at Castella, Cal., during the year ending Sept. 30, 1915.

[Made by H. J. Tompkins.]

Date.	Gage height.	Discharge.
	Feet.	*Sec.-ft.*
Oct. 15	2.62	226
Apr. 27	4.99	2,500
Sept. 5	2.51	242

Daily discharge, in second-feet, of Sacramento River at Castella, Cal., for the year ending Sept. 30, 1915.

Day.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.
1	225	295	212	225	4,530	1,060	2,960	1,960	2,570	975	390	255
2	225	242	212	225	4,610	975	3,090	1,730	2,700	975	390	255
3	225	200	242	225	3,350	975	3,630	1,510	2,080	930	365	255
4	225	188	212	242	1,730	975	3,350	1,400	2,080	888	365	255
5	225	188	242	260	1,300	1,060	2,830	1,300	2,320	805	340	275
6	225	188	260	278	1,060	975	2,440	1,400	2,440	765	317	275
7	225	188	242	315	1,060	930	3,090	1,730	2,700	765	317	275
8	225	175	212	398	1,160	975	2,700	2,080	2,700	728	317	255
9	315	188	212	315	2,320	975	2,440	3,090	2,080	728	317	255
10	335	188	242	260	1,400	975	2,440	5,050	1,840	690	317	255
11	295	188	242	242	1,160	975	2,440	4,750	1,510	690	317	255
12	295	188	242	225	975	1,200	2,960	4,610	1,510	655	317	255
13	260	188	225	260	888	1,300	3,090	3,630	1,510	620	317	255
14	225	188	225	242	765	1,510	2,440	2,320	1,620	620	317	255
15	225	188	212	212	765	1,730	2,320	1,730	1,620	620	317	255
16	225	188	212	212	2,200	1,730	2,440	2,320	1,510	588	295	255
17	1,020	188	212	212	4,050	1,840	3,090	3,350	1,510	588	275	255
18	335	188	212	200	4,470	1,840	3,220	3,220	1,510	588	275	255
19	1,020	188	212	212	2,200	1,620	3,350	2,570	1,510	588	275	255
20	470	188	212	212	1,960	1,840	3,350	2,320	1,400	588	275	255
21	200	188	212	212	1,620	1,840	3,220	2,080	1,250	555	275	255
22	200	188	212	212	1,300	2,080	2,830	1,960	1,250	525	275	255
23	200	188	212	212	1,250	2,440	2,570	2,080	1,250	495	275	255
24	200	188	212	212	1,620	2,570	2,200	2,830	1,160	468	255	255
25	200	188	212	225	1,400	2,440	2,440	2,200	1,060	440	255	255
26	188	188	212	315	1,300	2,440	2,080	2,080	1,020	440	255	255
27	188	188	212	335	1,250	2,960	2,320	1,960	975	415	255	255
28	175	212	212	675	1,110	7,620	2,960	2,830	975	415	255	255
29	175	242	212	710	....	5,800	3,630	2,570	930	415	255	255
30	242	212	212	1,930	....	4,470	2,570	2,700	975	415	255	255
31	212	....	212	1,380	....	3,630	....	2,830	....	415	255	....

Note.—Discharge determined from two rating curves fairly well defined below 3,500 second-feet, applicable Oct. 1 to Feb. 1 and Feb. 2 to Sept. 30, respectively.

Monthly discharge of Sacramento River at Castella, Cal., for the year ending Sept. 30, 1915.

[Drainage area, 257 square miles.]

Month.	Discharge in second-feet.				Run-off.		Accuracy.
	Maximum.	Minimum.	Mean.	Per square mile.	Depth in inches on drainage area.	Total in acre-feet.	
October	1,020	175	290	1.13	1.30	17,800	B.
November	295	175	197	.767	.86	11,700	B.
December	260	212	223	.868	1.00	13,700	B.
January	1,930	200	367	1.43	1.65	22,600	B.
February	4,610	765	1,890	7.35	7.65	105,000	B.
March	7,620	930	2,060	8.02	9.25	127,000	B.
April	3,630	2,080	2,820	11.0	12.27	168,000	B.
May	5,050	1,300	2,520	9.81	11.31	155,000	B.
June	2,700	930	1,650	6.42	7.16	98,200	B.
July	975	415	626	2.44	2.81	38,500	B.
August	390	255	299	1.16	1.34	18,400	B.
September	275	255	257	1.00	1.12	15,300	B.
The year	7,620	175	1,090	4.24	57.72	791,000	

SACRAMENTO RIVER NEAR RED BLUFF, CAL.

Location.—In lot 4, sec. 34, T. 28 N., R. 3 W., at the lower end of Iron Canyon, 4 miles northeast of Red Bluff, Tehama County, and about 3 miles below the proposed Iron Canyon dam site. Paines Creek enters about 3 miles above and Antelope Creek about 7 miles below the station.

Drainage area.—9,300 square miles, not including the drainage area of Goose Lake—1,090 square miles—which belongs naturally in Pit River basin but has contributed no water except for a short time in 1869 and for more than two hours during a severe storm from the north in 1881, when the lake overflowed to North Fork of Pit River. Previously published figures of discharge in second-feet per square mile and run-off in depth in inches, based on the drainage area including Goose Lake, should be used with caution because of the large noncontributing area.

Records available.—January 28, 1902, to September 30, 1915. The State engineer in 1879 and the commissioner of public works in 1893 and 1894 made measurements at this point. From April 30, 1895, to June 30, 1902, a gaging station was maintained at Jellys Ferry, 12 miles above Red Bluff.

Gage.—Staff in seven sections on left bank; read twice a day by Richard Groebe. Several gages have been used at this station, but all observations have been reduced to the present datum. The United States Weather Bureau gage at Red Bluff has often been used.

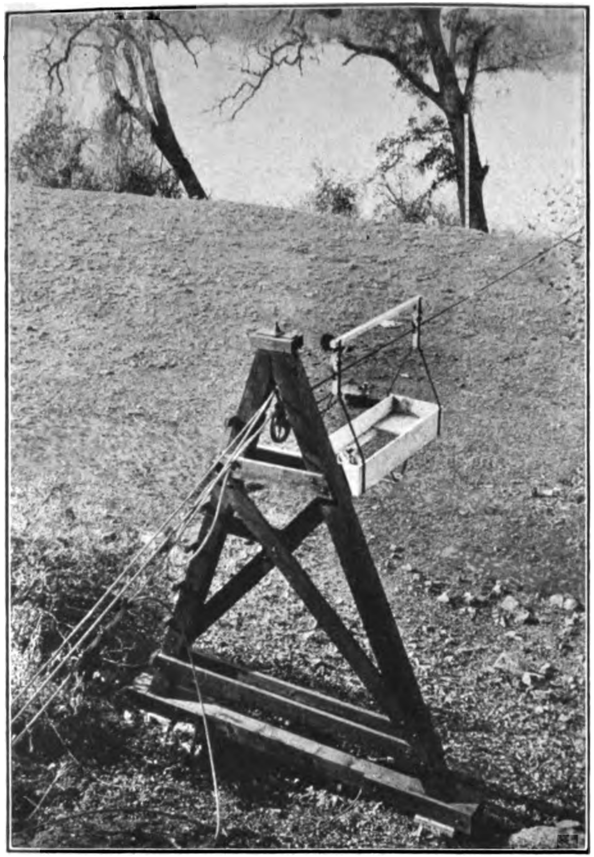
Discharge measurements.—Made from a cable (Pl. VII, *A*) 50 feet upstream from gage.

Channel and control.—Coarse gravel and small boulders; practically permanent.

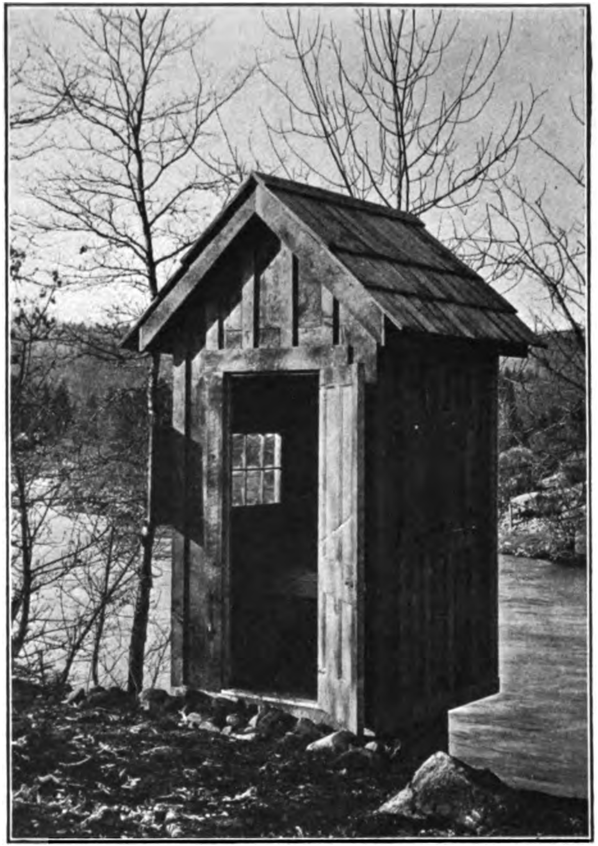
Extremes of discharge.—Maximum stage recorded during year, 34.0 feet at 4 p. m. Feb. 2, 1915 (discharge, 262,000 second-feet); minimum stage recorded, 1.3 feet September 9 to 12 (discharge, 4,880 second-feet).

1902–1915: Maximum stage recorded, 35.2 feet February 3, 1909 (discharge, 278,000 second-feet); minimum stage recorded, 0.9 foot September 7 to 28, 1903 (discharge, 3,980 second-feet).

Diversions.—A small amount of water is diverted from some of the minor tributaries for irrigation. With this exception the record at this station gives the natural run-off from the basin.



A. CABLE SUPPORT ON SACRAMENTO RIVER AT RED BLUFF, CAL.



B. TIMBER WELL AND GAGE HOUSE ON PIT RIVER AT HENDERSON, CAL.

Regulation.—No storage of any importance has been developed in the drainage area above the station.

Accuracy.—Since 1902 there has been no change in the rating curve above gage height 2.3 feet. The maximum change in the low-water portion of the curve at the minimum recorded gage height of 0.9 foot is only 5.0 per cent; results excellent.

Discharge measurements of Sacramento River near Red Bluff, Cal., during the year ending Sept. 30, 1915.

[Made by Charles Leidl.]

Date.	Gage height.	Discharge.	Date.	Gage height.	Discharge.	Date.	Gage height.	Discharge.
	Feet.	*Sec.-ft.*		*Feet.*	*Sec.-ft.*		*Feet.*	*Sec.-ft.*
Feb. 4	14.62	65,600	Feb. 5	10.89	42,700	Feb. 9	16.57	77,900
4	13.60	59,500	9	17.36	84,500	10	13.50	59,200

Daily discharge, in second-feet, of Sacramento River near Red Bluff, Cal., for the year ending Sept. 30, 1915.

Day.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.
1	5,210	5,880	6,120	6,120	97,600	30,800	45,800	18,200	19,000	8,600	6,090	5,110
2	5,210	6,120	6,370	6,120	249,000	27,600	39,000	16,600	18,200	8,600	5,840	5,110
3	5,210	6,120	9,220	6,370	115,000	24,900	49,200	15,900	17,000	8,300	5,840	5,110
4	5,210	5,880	8,600	7,430	63,000	22,700	38,000	15,100	15,900	8,300	5,840	5,110
5	5,210	5,650	10,900	11,500	42,600	21,400	33,200	14,800	15,500	8,000	5,590	5,110
6	5,210	5,650	10,200	21,000	32,200	20,600	29,900	14,400	15,500	8,000	5,590	5,110
7	5,210	5,650	8,600	27,600	28,000	19,400	29,900	14,400	15,500	8,000	5,590	5,110
8	5,210	5,650	9,540	49,200	68,200	18,600	30,300	14,400	15,100	8,000	5,530	5,110
9	5,650	5,650	8,600	25,800	83,700	18,200	27,600	16,200	14,800	7,710	5,590	4,880
10	6,630	5,650	15,100	16,200	56,200	17,400	25,800	52,100	14,000	7,710	5,590	4,880
11	5,880	5,650	13,700	12,200	40,000	17,400	24,900	61,700	12,900	7,430	5,590	4,880
12	5,650	5,650	9,860	11,900	30,800	18,200	24,900	58,000	12,200	7,150	5,590	4,880
13	5,430	5,650	7,710	14,800	26,200	20,600	28,000	47,000	11,900	7,150	5,590	5,110
14	5,430	5,650	7,430	43,200	22,700	21,400	24,000	37,000	11,500	7,150	5,590	5,110
15	5,430	5,650	6,630	19,400	20,600	22,300	22,700	28,500	11,500	6,880	5,350	5,110
16	5,430	5,650	6,630	16,200	35,100	22,300	22,300	28,000	11,500	6,610	5,350	5,110
17	5,650	5,650	7,430	11,500	52,600	22,300	23,200	33,200	11,500	6,610	5,350	5,110
18	8,300	5,650	6,630	10,200	66,900	22,300	23,200	38,500	11,200	6,610	5,350	5,110
19	8,000	5,650	6,890	9,860	50,900	21,400	22,700	32,200	10,900	6,610	5,350	5,110
20	8,600	5,650	7,710	9,220	46,400	20,600	23,200	28,500	10,500	6,610	5,350	5,110
21	7,160	5,650	6,630	8,910	37,000	19,400	22,300	26,700	10,200	6,350	5,110	5,110
22	6,370	5,650	6,120	8,300	40,600	21,000	22,300	25,400	10,200	6,350	5,110	5,110
23	6,120	5,650	6,120	8,000	44,200	21,000	21,000	23,200	9,860	6,350	5,110	5,110
24	5,880	5,650	6,120	8,300	64,900	22,300	20,200	27,600	9,540	6,090	5,110	5,110
25	5,880	5,430	6,120	8,600	55,600	22,300	21,400	26,700	9,540	6,350	5,110	5,110
26	5,650	5,430	6,120	12,900	41,100	22,300	21,000	24,000	9,220	6,090	5,110	5,110
27	5,650	5,430	6,370	21,900	34,600	23,600	19,800	23,200	9,220	6,090	5,110	5,110
28	5,650	6,890	6,120	40,000	37,000	84,400	18,600	22,700	9,220	6,090	5,110	5,110
29	5,650	6,120	6,120	54,400	....	80,000	20,600	21,900	8,910	6,090	5,110	5,110
30	5,650	6,120	6,120	50,900	....	68,900	20,600	20,600	8,910	6,090	5,110	5,110
31	5,650	....	6,120	60,500	....	58,000	....	19,800	....	6,090	5,110	....

Note.—Discharge determined from two well-defined rating curves applicable Oct. 1 to Feb. 2 and Feb. 3 to Sept. 30.

Monthly discharge of Sacramento River near Red Bluff, Cal., for the year ending Sept. 30, 1915.

[Drainage area, 9,300 square miles.]

Month.	Discharge in second-feet.			Run-off.			Accuracy.
	Maximum.	Minimum.	Mean.	Per square mile.	Depth in inches on drainage area.	Total in acre-feet.	
October	8,600	5,210	5,910	0.635	0.73	363,000	A.
November	6,890	5,430	5,750	.618	.69	342,000	A.
December	15,100	6,120	7,800	.839	.97	480,000	A.
January	60,500	6,120	20,000	2.15	2.48	1,230,000	A.
February	249,000	20,600	56,500	6.08	6.33	3,140,000	A.
March	84,400	17,400	28,200	3.03	3.49	1,730,000	A.
April	49,200	18,600	26,500	2.85	3.18	1,580,000	A.
May	61,700	14,400	27,300	2.94	3.39	1,680,000	A.
June	19,000	8,910	12,400	1.33	1.48	738,000	A.
July	8,600	6,090	7,030	.756	.87	432,000	A.
August	6,090	5,110	5,410	.582	.67	333,000	A.
September	5,110	4,880	5,080	.546	.61	302,000	A.
The year	249,000	4,880	17,100	1.84	24.89	12,400,000	

PIT RIVER AT HENDERSON, CAL.

Location.—In sec. 36, T. 37 N., R. 1 W., at Big Bend ferry, one-fourth mile above Henderson in Shasta County. Nelson Creek enters half a mile above and Kosk Creek 1 mile below the station.

Drainage area.—Not measured.

Records available.—September 28, 1910, to September 30, 1915.

Gage.—Gurley electric water-stage recorder (Pl. VII, *B*) 50 feet below vertical staff fastened to an alder tree on left bank about 100 feet above ferry. Original datum has been maintained. The gages do not read exactly the same on account of the slope of the water surface. Staff gage is the original gage; recorder was set in operation December 28, 1912.

Discharge measurements.—Made from cable 25 feet downstream from water-stage recorder.

Channel and control.—Rough; composed of boulders and coarse gravel; fairly permanent. One channel at all stages; banks not subject to overflow.

Extremes of discharge.—Maximum stage during year from water-stage recorder record, 2.38 feet at 10.30 p. m. February 2 (discharge, 5,900 second-feet); minimum stage recorded, 0.7 foot August 6 to 31 (discharge, 2,540 second-feet).

1910–1915: Maximum stage recorded, 5.3 feet March 25, 1911 (discharge, 13,200 second-feet); minimum stage recorded, 0.60 foot September 23 to 25, 1913 (discharge, 2,490 second-feet).

Winter flow.—Stage-discharge relation not affected by ice.

Diversions.—No information.

Regulation.—None.

Accuracy.—Fluctuations in daily flow are remarkably small; results excellent for the range of stage of this year.

Cooperation.—Staff-gage readings for periods when water-stage recorder was not in operation were furnished by Mount Shasta Power Co., through W. A. Cooper.

Discharge measurements of Pit River at Henderson, Cal., during the year ending Sept. 30, 1915.

[Made by H. J. Tompkins.]

Date.	Gage height.	Discharge.	Date.	Gage height.	Discharge.	Date.	Gage height.	Discharge.
	Feet.	*Sec.-ft.*		*Feet.*	*Sec.-ft.*		*Feet.*	*Sec.-ft.*
Oct. 20	0.98	3,220	Apr. 18	1.62	4,640	Apr. 22	1.60	4,270
23	.90	3,080	19	1.64	4,340	July 28	.80	2,790

Daily discharge, in second-feet, of Pit River at Henderson, Cal., for the year ending Sept. 30, 1915.

Day.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.
1	2,850	2,940	2,940	2,780	4,250	4,760	4,530	3,850	3,950	2,860	2,780	2,620
2	2,850	2,940	3,020	2,780	5,720	4,560	4,530	3,850	3,850	2,860	2,620	2,620
3	2,850	2,940	3,020	2,780	5,400	4,350	5,150	3,760	3,760	2,860	2,620	2,620
4	2,850	2,940	3,020	2,780	4,980	4,250	5,040	3,660	3,560	2,860	2,620	2,620
5	2,850	2,940	3,020	2,860	4,660	4,150	5,040	3,660	3,470	2,860	2,620	2,620
6	2,850	2,940	3,020	2,860	4,250	4,050	4,840	3,560	3,470	2,860	2,540	2,620
7	3,020	2,940	2,940	2,940	4,050	4,050	4,630	3,560	3,470	2,860	2,540	2,620
8	3,020	2,940	2,940	3,020	4,560	3,950	4,630	3,470	3,380	2,860	2,540	2,620
9	3,020	2,860	2,940	2,940	5,080	3,850	4,430	3,470	3,290	2,860	2,540	2,620
10	3,020	2,860	2,940	2,860	4,560	3,760	4,430	3,760	3,200	2,860	2,540	2,620
11	3,020	2,860	2,940	2,940	4,250	3,760	4,430	4,350	3,200	2,860	2,540	2,620
12	2,850	2,860	2,940	2,940	3,950	3,760	4,430	4,760	3,110	2,860	2,540	2,620
13	2,850	2,860	2,940	2,940	3,560	3,950	4,430	4,980	3,020	2,860	2,540	2,620
14	2,850	2,860	2,860	2,940	3,560	4,050	4,330	4,980	2,940	2,860	2,540	2,620
15	2,850	2,860	2,780	2,940	3,560	4,130	4,230	5,080	2,940	2,780	2,540	2,620
16	2,850	2,860	2,860	2,860	3,950	4,330	4,350	5,080	3,110	2,780	2,540	2,620
17	2,850	2,860	2,860	2,860	5,080	4,530	4,350	4,870	3,020	2,780	2,540	2,620
18	2,850	2,860	2,860	2,860	5,290	4,530	4,350	4,980	3,020	2,780	2,540	2,620
19	2,850	2,860	2,860	2,860	5,180	4,730	4,350	4,980	2,940	2,780	2,540	2,620
20	2,850	2,860	2,860	2,860	4,980	4,530	4,350	4,870	2,940	2,780	2,540	2,620
21	2,850	2,860	2,780	2,860	4,760	4,330	4,350	4,760	2,940	2,780	2,540	2,620
22	2,940	2,940	2,780	2,780	4,760	4,330	4,250	4,870	2,940	2,780	2,540	2,620
23	2,940	2,860	2,780	2,780	4,760	4,250	4,150	4,660	2,940	2,780	2,540	2,620
24	2,940	2,860	2,780	2,780	4,660	4,250	4,050	4,660	2,940	2,780	2,540	2,620
25	2,940	2,860	2,780	2,780	4,450	4,030	4,050	4,660	2,940	2,780	2,540	2,620
26	2,940	2,860	2,780	2,780	4,350	4,030	4,050	4,660	2,940	2,780	2,540	2,620
27	2,940	2,940	2,780	2,860	4,250	4,130	3,950	4,560	2,940	2,780	2,540	2,620
28	2,940	3,020	2,780	2,940	4,450	4,230	3,950	4,450	2,860	2,780	2,540	2,620
29	2,940	3,020	2,780	3,020	....	4,330	4,050	4,350	2,860	2,780	2,540	2,620
30	2,940	3,020	2,780	3,200	....	4,630	3,950	4,250	2,860	2,780	2,540	2,620
31	2,940	....	2,780	3,470	....	4,630	....	4,050	....	2,780	2,540	....

NOTE.—Discharge determined from two well-defined rating curves, one for each gage. Water-stage recorder not running Oct. 1-21; Mar. 15-22 and 25 to Apr. 15, and Aug. 2, to Sept. 30; staff gage record obtained for these periods.

Monthly discharge of Pit River at Henderson, Cal., for the year ending Sept. 30. 1915.

Month.	Discharge in second-feet.			Run-off (total in acre-feet).	Accuracy.
	Maximum.	Minimum.	Mean.		
October	3,020	2,850	2,910	179,000	A.
November	3,020	2,860	2,900	173,000	A.
December	3,020	2,780	2,880	177,000	A.
January	3,470	2,780	2,900	178,000	A.
February	5,720	3,560	4,550	253,000	A.
March	4,760	3,760	4,230	260,000	A.
April	5,150	3,950	4,390	261,000	A.
May	5,080	3,470	4,370	269,000	A.
June	3,950	2,860	3,160	188,000	A.
July	2,860	2,780	2,810	173,000	A.
August	2,780	2,540	2,560	157,000	A.
September	2,620	2,620	2,620	156,000	A.
The year	5,720	2,540	3,350	2,420,000	

PIT RIVER NEAR YDALPOM, CAL.

Location.—In the NW. ¼ sec. 32, T. 34 N., R. 3 W., at Silverthorne Ferry, 1½ miles southwest of Ydalpom, Shasta County, and 7½ miles above junction with Sacramento River. Squaw Creek enters half a mile above and McCloud River 4 miles below the station.

Drainage area.—5,260 square miles, not including the drainage area of Goose Lake—1,090 square miles—which belongs naturally in Pit River basin, but has contributed no water except for a short time in 1869 and for more than two hours during a severe storm from the north in 1881, when the lake overflowed to North Fork of Pit River. Previously published figures of discharge in second-feet per square mile and run-off in depth in inches, based on the drainage area including Goose Lake, should be used with caution because of the large noncontributing area.

Records available.—November 16, 1910, to September 30, 1915.

Gage.—Vertical staff in two sections fastened to an ash tree on left bank 350 feet below ferry, gage read usually once a day by M. D. Rodrigue.

Discharge measurements.—Made from car and cable 50 feet above ferry cable.

Channel and control.—Gravel and sand; appears permanent.

Extremes of discharge.—Maximum stage recorded during year: 14.6 feet at 7.30 a. m. February 2 (discharge, 33,900 second-feet); minimum stage recorded, 2.8 feet, August 13 to September 30 (discharge, 2,740 second-feet).

1910–1915: Maximum stage recorded, 18.2 feet, December 31, 1913 (discharge, computed from extension of rating curve, 47,000 [1] second-feet); minimum stage recorded, 2.8 feet, occurred for about a month in 1913, 1914, and 1915 (discharge, 2,740 second-feet).

Diversions.—A small amount of water for irrigation is diverted from the main stream and tributaries above the station.

Accuracy.—Results excellent. Rating curve now used is applicable since the station was established and is defined by discharge measurements for all stages but the very highest.

The following discharge measurement was made by H. J. Tompkins:

September 3, 1915: Gage height, 2.80 feet; discharge, 2,830 second-feet.

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[1] Figure published in Water-Supply Paper 391, p. 213, is in error.

Daily discharge, in second-feet, of Pit River near Ydalpom, Cal., for the year ending Sept. 30, 1915.

Day.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.
1	2,880	3,030	3,180	3,330	26,600	10,100	10,500	5,820	5,280	3,480	3,030	2,740
2	2,880	3,030	3,480	3,330	30,300	9,390	11,000	5,460	5,110	3,480	3,030	2,740
3	2,880	3,030	4,100	3,480	19,600	8,330	11,200	5,110	5,110	3,480	3,030	2,740
4	2,880	3,030	4,600	3,480	16,900	7,920	10,300	4,940	4,940	3,330	3,030	2,740
5	2,880	3,030	4,430	3,940	9,390	7,520	9,830	4,940	4,770	3,330	3,030	2,740
6	2,880	3,030	3,940	5,280	7,920	6,550	9,390	4,770	4,600	3,330	3,030	2,740
7	2,880	3,030	3,780	6,550	7,320	6,360	8,750	4,770	4,600	3,330	3,030	2,740
8	2,880	3,030	3,630	11,000	9,390	6,180	8,120	4,600	4,430	3,330	3,030	2,740
9	2,880	3,030	3,480	9,170	13,200	6,000	7,920	9,170	4,430	3,330	2,880	2,740
10	3,180	3,030	3,330	4,940	10,100	6,000	7,520	12,400	4,260	3,330	2,880	2,740
11	3,180	3,030	3,330	4,100	8,540	5,820	7,320	14,500	4,260	3,330	2,880	2,740
12	3,030	3,180	3,330	4,600	7,920	6,550	7,120	13,900	4,260	3,330	2,880	2,740
13	3,030	3,180	3,330	6,000	7,520	7,120	6,930	11,200	4,100	3,330	2,740	2,740
14	3,030	3,180	3,330	6,740	7,320	7,320	6,930	10,300	4,100	3,330	2,740	2,740
15	3,030	3,180	3,330	6,360	7,720	7,520	6,740	9,390	3,940	3,180	2,740	2,740
16	3,030	3,180	3,330	5,640	9,390	7,320	6,550	8,330	3,940	3,180	2,740	2,740
17	3,180	3,180	3,330	4,600	15,500	7,320	6,360	8,330	3,940	3,180	2,740	2,740
18	3,180	3,180	3,330	3,940	16,600	7,320	6,360	8,120	3,940	3,180	2,740	2,740
19	3,180	3,180	3,330	3,940	12,400	7,320	6,360	8,120	3,940	3,180	2,740	2,740
20	3,940	3,180	3,330	3,940	11,500	7,320	6,180	7,920	3,780	3,030	2,740	2,740
21	3,330	3,180	3,330	3,780	9,610	7,520	6,180	7,920	3,780	3,030	2,740	2,740
22	3,180	3,180	3,330	3,780	10,500	7,120	6,000	7,720	3,630	3,030	2,740	2,740
23	3,180	3,180	3,330	3,630	14,200	7,120	6,000	7,520	3,630	3,030	2,740	2,740
24	3,030	3,180	3,330	3,630	13,200	6,930	6,000	7,320	3,630	3,030	2,740	2,740
25	3,030	3,180	3,480	3,630	11,900	6,930	6,000	7,120	3,630	3,030	2,740	2,740
26	3,030	3,180	3,480	4,260	11,700	7,320	6,000	6,740	3,630	3,030	2,740	2,740
27	3,030	3,180	3,330	5,280	11,000	8,750	6,000	6,740	3,630	3,030	2,740	2,740
28	3,030	3,180	3,330	6,000	10,500	11,700	6,000	6,360	3,630	3,030	2,740	2,740
29	3,030	3,180	3,330	7,520	....	13,200	6,000	6,000	3,630	3,030	2,740	2,740
30	3,030	3,180	3,180	10,100	....	12,200	5,820	5,820	3,480	3,030	2,740	2,740
31	3,030	....	3,180	11,900	....	11,200	....	5,640	....	3,030	2,740	....

NOTE.—Discharge determined from a well-defined rating curve.

Monthly discharge of Pit River near Ydalpom, Cal., for the year ending Sept. 30, 1915.

[Drainage area, 5,260 square miles.]

Month.	Discarge in second-feet.				Run-off.		Accuracy.
	Maximum.	Minimum.	Mean.	Per square mile.	Depth in inches on drainage area.	Total in acre-feet.	
October	3,940	2,880	3,060	0.582	0.67	188,000	A.
November	3,180	3,030	3,120	.593	.66	186,000	A.
December	4,600	3,180	3,480	.662	.76	214,000	A.
January	11,900	3,330	5,420	1.03	1.19	333,000	A.
February	30,300	7,320	12,400	2.36	2.46	689,000	A.
March	13,200	5,820	7,910	1.50	1.73	486,000	A.
April	11,200	5,820	7,380	1.40	1.56	439,000	A.
May	14,500	4,600	7,640	1.45	1.67	470,000	A.
June	5,280	3,480	4,130	.785	.88	246,000	A.
July	3,480	3,030	3,200	.608	.70	197,000	A.
August	3,030	2,740	2,830	.538	.62	174,000	A.
September	2,740	2,740	2,740	.521	.58	163,000	A.
The year	30,300	2,740	5,230	.994	13.48	3,780,000	

HAT CREEK AT HAT CREEK, CAL.

LOCATION.—In the SE. ¼ sec. 10, T. 34 N., R. 4 E., at private highway bridge on Morris ranch, in Lassen National Forest, 1 mile north of Hat Creek post office, Shasta County.

DRAINAGE AREA.—Not measured.

RECORDS AVAILABLE.—September 22, 1910, to September 30, 1915.

Gage.—Vertical staff fastened to downstream end of right abutment of bridge; read occasionally by Fred Seaborn. This gage was carried out by the mud flow from Lassen volcano in May, 1915. A new gage at a new datum was installed at the same location July 25, 1915.

Discharge measurements.—Made from downstream side of bridge.

Channel and control.—Rough; composed of gravel and small boulders; shift seldom.

Extremes of stage.—Maximum stage recorded during year, 2.95 feet at 3.55 p. m. May 17; minimum stage recorded is of no value due to change in datum.

1910–1915: Maximum stage recorded, 2.95 feet at 3.55 p. m. May 17, 1915; minimum stage recorded, 1.73 feet September 11, 1913 (discharge, 24 second-feet).

Winter flow.—No information.

Diversions.—On account of the diversions for irrigation above the station this record does not show the natural run-off from the drainage basin. On May 13, 1911, nine ditches were diverting a total of 110 second-feet. Of this amount, it was estimated that 55 second-feet was returned to the stream above the gage.

Regulation.—No information.

Accuracy.—The rating of the old gage was not checked after September, 1913. Only two measurements have been secured for the new gage and these indicate a shift between them. Weeds grow in the channel during the summer months and affect the rating. For these reasons no estimates of discharge for the year have been attempted.

Cooperation.—Gage-height record furnished by United States Forest Service.

The following measurement was made by H. J. Tompkins:
July 25, 1915: Gage height, 1.32 feet; discharge, 115 second-feet.

Daily gage height, in feet, of Hat Creek at Hat Creek, Cal., for the year ending Sept. 30, 1915.

Day.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May.	July.	Aug.	Sept.
1						2.55				1.3	
2				2.6							
3		2.65	2.6					2.7			
4											
5											
6						2.5		2.6			
7											
8											
9			2.6								1.45
10											
11											
12											
13	2.65										1.4
14	2.7										
15								2.8			
16											
17								2.95			
18							2.9				
19			2.6								
20					2.55	2.6					
21											
22											
23											1.4
24						2.55					
25					2.55				1.3		
26					2.5						
27							2.65				
28					2.55						
29											
30		2.55									
31											

Note.—New gage and datum beginning July 25, 1915.

KOSK CREEK NEAR HENDERSON, CAL.

Location.—In sec. 12, T. 37 N., R. 1 W., above bridge on Holm ranch, in Shasta National Forest, 3½ miles above the mouth of the creek, and 4 miles north of Henderson, Shasta County. Baker Creek enters about one-fourth mile below the station.

Drainage area.—51.9 square miles.

Records available.—October 1, 1910, to September 30, 1915 (not complete).

Gage.—Vertical staff fastened to an alder tree on left bank 100 feet above bridge; read once a day, occasionally, by P. D. Lofton.

Discharge measurements.—Made from bridge or by wading.

Channel and control.—Gravel and small boulders; fairly permanent.

Extremes of discharge.—Maximum stage recorded during year and period 1910–1915, 8.0 feet at 9 a. m. May 11, 1915 (discharge, 2,920 second-feet, determined from extension of rating curve and may be subject to error); minimum stage recorded, 2.78 feet at 7 a. m. December 21 and at 2 p. m. December 25, 1914 (discharge, 19 second-feet).

Diversions.—None.

Regulation.—None.

Accuracy.—Determinations of discharge for days on which gage was read are good; discharge for other days subject to error.

Cooperation.—Gage-height record furnished by United States Forest Service.

Discharge measurement of Kosk Creek near Henderson, Cal., during the year ending Sept. 30, 1915.

[Made by H. J. Tompkins.]

Date.	Gage height.	Discharge.
	Feet.	*Sec.-ft.*
Oct. 21	3.10	52
Apr. 17	5.35	726

Daily discharge, in second-feet, of Kosk Creek near Henderson, Cal., for the year ending Sept. 30, 1915.

Day.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.
1	30	32	[a]24	64	1,080	370	1,490	[a]411	[a]433	[a]110	62	[a]47
2	32	[a]32	24	[a]62	2,500	350	1,200	331	390	[a]110	[a]62	[a]47
3	32	[a]32	[a]24	[a]60	785	331	1,420	[a]322	331	110	[a]61	46
4	32	[a]32	[a]23	[a]58	[a]733	312	[a]1,300	312	331	110	[a]61	[a]42
5	[a]32	[a]32	[a]23	56	[a]681	312	[a]1,190	[a]312	312	110	[a]61	[a]39
6	[a]32	[a]32	[a]22	[a]100	[a]629	[a]306	[a]1,070	312	[a]303	110	[a]60	36
7	32	32	22	[a]200	[a]578	[a]300	959	295	[a]295	[a]107	60	[a]36
8	[a]40	[a]31	[a]22	[a]250	[a]527	[a]294	843	[a]278	[a]286	[a]104	[a]60	[a]36
9	48	[a]30	[a]22	[a]100	476	[a]288	785	2,600	278	[a]102	[a]59	[a]36
10	56	29	22	51	[a]447	[a]283	[a]800	2,300	[a]249	100	[a]59	[a]36
11	[a]52	[a]29	[a]22	[a]50	[a]418	278	814	2,920	220	94	[a]59	36
12	[a]48	[a]29	[a]21	[a]50	[a]390	[a]400	901	1,420	194	[a]92	[a]58	[a]36
13	[a]45	[a]28	21	[a]49	[a]362	523	[a]843	1,340	[a]194	[a]90	[a]58	[a]36
14	[a]42	[a]28	[a]21	[a]48	[a]334	[a]530	785	[a]1,190	[a]194	[a]88	[a]58	[a]36
15	[a]39	28	[a]21	48	[a]306	[a]537	729	[a]1,050	[a]194	86	[a]57	[a]36
16	36	[a]28	[a]20	[a]48	278	[a]544	729	901	194	[a]86	[a]57	36
17	138	[a]27	[a]20	48	1,490	[a]551	785	1,080	[a]182	86	[a]57	[a]36
18	[a]124	[a]26	20	[a]48	1,490	[a]558	[a]814	959	170	[a]84	[a]56	36
19	110	26	[a]20	[a]49	1,140	[a]565	843	843	[a]164	[a]83	56	[a]36
20	56	[a]26	[a]19	[a]50	675	572	[a]788	[a]805	159	[a]82	[a]56	[a]36
21	46	[a]26	19	[a]51	623	623	[a]733	[a]767	148	80	[a]55	36
22	[a]43	[a]25	[a]19	51	523	[a]733	[a]678	729	128	[a]74	[a]55	[a]36
23	[a]40	[a]25	[a]19	[a]51	476	843	623	623	[a]128	67	[a]54	[a]36
24	[a]38	25	[a]19	[a]50	548	814	[a]573	[a]676	[a]128	[a]67	54	[a]36
25	36	[a]25	19	[a]49	572	843	523	729	[a]128	[a]67	[a]54	36
26	[a]36	[a]25	[a]19	48	476	901	[a]523	675	128	[a]67	[a]53	[a]36
27	36	25	[a]20	[a]102	432	843	[a]523	[a]624	[a]122	[a]67	[a]52	[a]36
28	[a]34	[a]25	20	155	390	1,490	523	[a]573	[a]116	[a]67	[a]51	[a]36
29	[a]33	[a]24	[a]20	184	....	1,570	572	523	110	67	[a]50	[a]36
30	32	24	[a]20	220	....	1,490	[a]491	523	[a]110	[a]66	[a]49	36
31	[a]32	....	20	454	....	1,340	....	476	....	65	48	....

[a] Estimated.

NOTE.—Discharge for days on which gage was read determined from a rating curve fairly well defined below 1,000 second-feet.

Monthly discharge of Kosk Creek near Henderson, Cal., for the year ending Sept. 30, 1915.

[Drainage area, 51.9 square miles.]

Month.	Discharge in second-feet.				Run-off.	
	Maximum.	Minimum.	Mean.	Per square mile.	Depth in inches on drainage area.	Total in acre-feet.
October	138	30	47.2	0.909	1.05	2,900
November	32	24	27.9	.538	.60	1,660
December	24	19	20.9	.403	.46	1,290
January	454	48	93.7	1.81	2.09	5,760
February	2,500	278	691	13.3	13.85	38,400
March	1,570	278	635	12.2	14.07	39,000
April	1,490	491	828	16.0	17.85	49,300
May	2,920	278	868	16.7	19.25	53,400
June	433	110	211	4.07	4.54	12,600
July	110	65	87.0	1.68	1.94	5,350
August	62	48	56.5	1.09	1.26	3,470
September	47	36	37.4	.721	.80	2,230
The year	2,920	19	297	5.72	77.76	215,000

McCLOUD RIVER AT BAIRD, CAL.

Location.—In the NW. ¼ sec. 23, T. 34 N., R. 4 W., at United States fishery at Baird, Shasta County, about 2 miles above junction with Pit River. Bailey Creek enters about 2,000 feet above and John Creek 2,000 feet below the station.

Drainage area.—665 square miles.

Records available.—December 22, 1910, to September 30, 1915.

Gage.—Vertical staff fastened to an alder tree on right bank, 600 feet above the hatchery; read once a day by G. H. Lambson.

Discharge measurements.—Made from car and cable 20 feet upstream from gage.

Channel and control.—Composed of gravel and cobblestones; fairly permanent.

Extremes of discharge.—Maximum stage recorded during year, 14.2 feet at noon February 2 (discharge, 27,300 second-feet); minimum stage recorded, 1.89 feet at noon December 31 (discharge, 1,200 second-feet).

1910–1915: Maximum stage recorded, 14.2 feet at noon February 2, 1915 (discharge, 27,300 second-feet); minimum stage recorded, October 17, 1910, a miscellaneous measurement, stage not referenced (discharge, 1,100 second-feet).

Diversions.—None.

Regulation.—None.

Accuracy.—Results excellent.

Cooperation.—Gage-height record furnished by G. H. Lambson, superintendent of the United States fishery.

The following discharge measurement was made by H. J. Tompkins:

September 2, 1915: Gage height, 2.18 feet; discharge, 1,530 second-feet.

Daily discharge, in second-feet, of McCloud River at Baird, Cal., for the year ending Sept. 30, 1915.

Day.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.
1	1,300	1,480	1,250	1,200	12,500	3,860	7,560	3,340	3,340	1,880	1,640	1,500
2	1,300	1,420	1,300	1,200	27,300	3,470	6,590	3,220	3,220	1,880	1,640	1,500
3	1,360	1,300	1,420	1,250	11,300	3,340	6,590	2,860	3,100	1,880	1,640	1,500
4	1,300	1,300	1,540	1,250	6,780	3,220	5,890	2,750	2,980	1,880	1,640	1,500
5	1,300	1,300	1,600	1,300	5,570	3,100	5,410	2,750	2,980	1,880	1,560	1,500
6	1,300	1,300	1,540	1,740	4,820	2,980	4,960	2,750	2,860	1,880	1,560	1,500
7	1,300	1,300	1,360	2,500	3,600	2,860	5,110	2,640	2,860	1,880	1,560	1,500
8	1,360	1,300	1,420	3,910	6,060	2,750	4,960	2,750	2,750	1,880	1,500	1,500
9	1,360	1,300	1,480	3,280	6,780	2,750	4,680	8,380	2,750	1,880	1,500	1,500
10	1,360	1,250	1,420	1,810	6,060	2,640	4,540	15,600	2,640	1,880	1,560	1,500
11	1,300	1,250	1,360	1,880	4,540	2,640	4,540	14,000	2,530	1,800	1,560	1,500
12	1,300	1,250	1,300	1,600	3,220	2,860	4,540	10,600	2,420	1,800	1,560	1,500
13	1,300	1,300	1,300	1,250	3,220	3,470	4,540	7,960	2,320	1,800	1,560	1,500
14	1,300	1,250	1,250	2,040	3,220	3,470	4,400	6,410	2,320	1,800	1,560	1,500
15	1,300	1,250	1,250	1,810	3,220	3,470	4,260	4,820	2,230	1,800	1,560	1,500
16	1,300	1,250	1,250	1,600	4,120	3,860	4,120	4,680	2,230	1,800	1,560	1,500
17	1,600	1,250	1,250	1,540	12,500	3,730	4,260	5,730	2,230	1,800	1,500	1,420
18	1,420	1,250	1,250	1,480	10,100	3,730	4,260	6,410	2,140	1,800	1,500	1,420
19	1,480	1,250	1,250	1,480	7,560	3,600	4,260	5,570	2,140	1,800	1,500	1,420
20	1,420	1,250	1,250	1,420	6,060	3,470	4,260	4,820	2,140	1,720	1,500	1,420
21	1,360	1,250	1,200	1,420	5,110	3,470	4,260	4,540	2,040	1,720	1,500	1,420
22	1,360	1,250	1,200	1,360	5,110	3,730	3,990	4,260	2,040	1,720	1,500	1,420
23	1,360	1,250	1,200	1,360	5,730	3,860	3,860	3,990	2,040	1,720	1,500	1,420
24	1,300	1,250	1,200	1,360	7,360	3,860	3,730	4,820	2,040	1,720	1,500	1,420
25	1,300	1,250	1,200	1,360	6,410	3,990	3,600	4,820	1,960	1,720	1,500	1,420
26	1,300	1,250	1,250	1,360	5,260	4,400	3,600	4,400	1,960	1,720	1,500	1,420
27	1,300	1,250	1,200	1,600	4,540	4,540	3,470	4,260	1,960	1,720	1,500	1,420
28	1,300	1,300	1,200	2,600	4,260	11,300	3,600	3,990	1,960	1,720	1,500	1,420
29	1,300	1,300	1,200	2,930	....	12,500	3,730	3,860	1,960	1,640	1,500	1,420
30	1,300	1,250	1,200	5,430	....	11,000	3,600	3,600	1,960	1,640	1,500	1,420
31	1,300	....	1,200	6,320	....	8,800	....	3,470	....	1,640	1,500	....

Note.—Discharge determined from two rating curves as follows: Oct. 1 to Feb. 2, well-defined below 17,000 second-feet; Feb. 3 to Sept. 30, well-defined.

Monthly discharge of McCloud River at Baird, Cal., for the year ending Sept. 30, 1915.

[Drainage area, 665 square miles.]

Month.	Discharge in second-feet.				Run-off.		Accuracy.
	Maximum.	Minimum.	Mean.	Per square mile.	Depth in inches on drainage area.	Total in acre-feet.	
October	1,600	1,300	1,340	2.02	2.33	82,400	A.
November	1,480	1,250	1,280	1.92	2.14	76,200	A.
December	1,600	1,200	1,300	1.95	2.25	79,900	A.
January	6,320	1,200	2,020	3.04	3.51	124,000	A.
February	27,300	3,220	6,870	10.3	10.73	382,000	A.
March	12,500	2,640	4,410	6.63	7.64	271,000	A.
April	7,560	3,470	4,570	6.87	7.67	272,000	A.
May	15,600	2,640	5,290	7.95	9.17	325,000	A.
June	3,340	1,960	2,400	3.61	4.03	143,000	A.
July	1,880	1,640	1,790	2.69	3.10	110,000	A.
August	1,640	1,500	1,540	2.32	2.68	94,700	A.
September	1,500	1,420	1,460	2.20	2.45	86,900	A.
The year	27,300	1,200	2,830	4.26	57.70	2,050,000	

DEER CREEK NEAR VINA, CAL.

Location.—In the NW. ¼ sec. 23, T. 25 N., R. 1 W., 2½ miles northeast of Roberts ranch house, about 9½ miles northeast of Vina, Tehama County.

Drainage area.—Not measured.

Records available.—October 17, 1911, to December 31, 1915, when the station was discontinued.

Gage.—Vertical staff fastened to a sycamore tree on left bank, one-fourth mile above location of old sheep bridge; read once a day by David Roberts.

Discharge measurements.—Made from car and cable 100 feet below gage or by wading.

Channel and control.—Gravel and small boulders; shifts during extremely high water.

Extremes of discharge.—Maximum stage recorded during year, 9.5 feet at 10 a. m. February 2 (discharge, 5,480 second-feet); minimum stage recorded, 1.93 feet at 8.30 a. m. September 30 (discharge, 104 second-feet).

1911–1915: Maximum stage recorded, 11.0 feet at 3.30 p. m. December 31, 1913 (discharge, 6,920 second-feet); minimum stage recorded, 2.02 feet during most of September and October, 1913 (discharge, 92 second-feet).

Diversions.—No information.

Regulation.—No information.

Accuracy.—Results excellent October to January. From February on there is some doubt about the applicability of the rating curve.

Discharge measurements of Deer Creek near Vina, Cal., during 1915.

Date.	Made by—	Gage height.	Discharge.	Date.	Made by—	Gage height.	Discharge.
		Feet.	*Sec.-ft.*			*Feet.*	*Sec.-ft.*
Jan. 19	H. J. Tompkins	2.35	170	Feb. 11	Charles Leidl	4.14	914
Feb. 6	Charles Leidl	3.33	515	Nov. 21	.....do	2.04	131
6	.....do	3.33	518				

Daily discharge, in second-feet, of Deer Creek near Vina, Cal., for the period Oct. 1, 1914, to Dec. 31, 1915.

Day.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.
1914–15.												
1	a 112	125	125	128	2,350	690	950	690	a 608	185	a 126	a 109
2	112	150	128	128	5,480	595	840	595	a 577	a 178	a 124	a 108
3	112	a 134	168	202	1,730	528	a 895	550	a 545	172	a 123	a 107
4	a 112	118	255	178	1,070	482	950	a 528	a 514	a 168	a 122	a 107
5	a 113	118	185	165	690	440	740	505	482	165	121	106
6	a 113	a 117	150	400	550	420	740	482	460	a 164	a 119	a 106
7	113	116	168	255	440	380	740	482	a 453	a 163	117	a 106
8	a 117	116	141	1,660	1,380	360	740	a 896	a 447	a 162	117	a 106
9	a 120	116	133	482	2,030	340	690	1,310	440	a 161	a 117	a 106
10	124	a 116	255	240	1,310	340	740	2,350	400	160	a 116	a 106
11	125	115	360	210	950	322	740	2,350	a 380	a 157	a 116	106
12	a 120	a 116	192	420	640	322	840	2,510	360	a 153	a 115	a 106
13	115	a 117	a 134	305	528	322	840	1,950	340	150	115	a 107
14	a 114	118	133	595	440	360	740	1,590	a 323	a 148	a 115	a 108
15	113	116	133	322	400	420	790	1,310	a 305	145	115	108
16	115	115	133	255	3,210	460	840	1,130	288	a 143	a 115	a 107
17	125	a 115	168	210	2,350	505	950	1,590	288	141	a 114	a 107
18	145	115	141	210	1,590	505	950	1,590	a 272	a 140	a 114	106
19	125	a 115	a 148	172	1,190	528	950	a 1,360	255	139	a 113	a 106
20	172	115	154	160	1,130	528	950	1,130	255	a 137	a 113	106
21	128	115	133	154	840	550	a 950	1,010	a 249	a 134	a 112	a 106
22	122	115	128	150	740	572	950	950	a 243	a 132	112	a 106
23	a 120	a 115	128	a 150	790	595	840	840	a 237	130	a 112	a 106
24	118	115	128	150	950	640	a 740	950	a 231	a 129	112	a 106
25	117	a 115	a 128	172	840	640	640	a 847	225	128	a 111	a 106
26	a 116	115	128	168	690	640	595	a 743	210	a 128	a 111	106
27	115	a 154	133	595	640	572	a 690	640	202	a 128	110	a 106
28	a 115	192	a 130	1,600	950	2,850	a 725	a 640	198	a 128	a 110	a 105
29	115	136	128	2,510	....	1,950	790	640	a 192	a 127	a 110	a 104
30	117	128	a 128	1,310	....	1,450	740	640	185	a 127	110	104
31	121	....	128	840	....	1,130	....	640	....	127	a 109	....

Day.	Oct.	Nov.	Dec.	Day.	Oct.	Nov.	Dec.	Day.	Oct.	Nov.	Dec.
1915.				1915.				1915.			
1				11				21		117	
2				12		112		22	106	128	
3	106	106		13	106		1,800	23			160
4			550	14		112		24		160	
5	106			15				25	106		
6		106	270	16				26			
7				17	106			27		150	
8				18			210	28			141
9		133		19				29			
10			240	20				30	106		
								31			138

a Interpolated.

Note.—Discharge determined from a well-defined rating curve, but its applicability after February, 1915, is somewhat doubtful. Discharge measurement on November 21, 1915, indicates that the rating curve used gives results which are about 12 per cent too small at a stage of 110 second-feet.

Monthly discharge of Deer Creek near Vina, Cal., for the year ending Sept. 30, 1915.

Month.	Discharge in second-feet.			Run-off (total in acre-feet).	Accuracy.
	Maximum.	Minimum.	Mean.		
October	172	112	120	7,380	A.
November	192	115	123	7,320	A.
December	360	125	157	9,650	A.
January	2,510	128	471	29,000	A.
February	5,480	400	1,280	71,100	B.
March	2,850	322	659	40,500	B.
April	950	595	808	48,100	B.
May	2,510	482	1,080	66,400	B.
June	608	185	339	20,200	B.
July	185	127	147	9,040	C.
August	126	109	115	7,070	C.
September	109	104	106	6,310	C.
The year	5,480	104	445	322,000	

STONY CREEK NEAR STONYFORD, CAL.

Location.—In the E. ½ sec. 35, T. 18 N., R. 7 W., 3½ miles from Stonyford, Colusa County.

Drainage area.—97 square miles.[1]

Records available.—April 1 to December 31, 1913 (monthly estimates), and January 1 to December 31, 1914, when the station was discontinued.

Gage.—Vertical staff fastened to rock; read by Eddie Laux.

Discharge measurements.—Made from car and cable 50 feet below gage.

Channel and control.—Shallow gravel; fairly permanent.

Extremes of discharge.—1913–14: Maximum mean daily discharge, 5,350 second-feet January 2, 1914; minimum mean daily discharge, 20 second-feet during parts of September and October ,1913.

Diversions.—No information.

Regulation.—No information.

Accuracy.—Maximum discharge computed from cross-section measurements and slope of water surface. Rating curve defined by current meter measurements below 5,000 second-feet.

Cooperation.—Complete record furnished by United States Reclamation Service.

Daily discharge, in second-feet, of Stony Creek near Stonyford, Cal., for the period Oct. 1 to Dec. 31, 1914.

Day.	Oct.	Nov.	Dec.	Day.	Oct.	Nov.	Dec.	Day.	Oct.	Nov.	Dec.
1	30	32	36	11	31	32	57	21	35	29	37
2	30	32	36	12	31	32	55	22	33	29	37
3	30	32	37	13	31	32	45	23	32	29	52
4	30	32	51	14	31	31	37	24	32	28	47
5	30	32	42	15	32	30	36	25	32	28	45
6	30	32	37	16	32	28	35	26	32	28	43
7	30	32	35	17	32	32	35	27	32	27	47
8	31	32	35	18	32	31	82	28	32	175	44
9	32	32	55	19	34	31	57	29	32	55	43
10	32	32	57	20	45	29	52	30	32	37	43
								31	32	......	47

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[1] Measured by U. S. Reclamation Service.

Monthly discharge of Stony Creek near Stonyford, Cal., for the period Oct. 1 to Dec, 31, 1914.

Month.	Discharge in second-feet.			Run-off (total in acre-feet).
	Maximum.	Minimum.	Mean.	
October	45	30	32.0	1,970
November	175	27	36.4	2,170
December	82	35	45.1	2,770
The period				6,910

NOTE.—Monthly discharge computed by engineers of the U. S. Geological Survey.

LITTLE STONY CREEK NEAR LODOGA, CAL.

Location.—At East Park reservoir, 4 miles above junction with Stony Creek and 3½ miles northwest of Lodoga, Colusa County.

Drainage area.—102 square miles.

Records available.—January 1, 1908, to September 30, 1915.

Gage.—Beginning December 1, 1910, the record is from the gage at the dam. Previous to this date the station was maintained a short distance below the present site.

Discharge.—Computed from gage heights observed at the dam. Correction has been made for evaporation, which is determined from records obtained from an evaporation pan at the reservoir. When the flow is 10 second-feet or less the discharge is computed from weir and current meter measurements taken at the head of the reservoir about 3 miles above the dam.

Extremes of discharge.—1907–1915: Maximum stage reported, 11.8 feet February 2, 1909 (discharge, 7,060 second-feet); no flow during periods of every year.

Diversions.—No information.

Regulation.—East Park reservoir is used for storage for the Orland project of the United States Reclamation Service.

Accuracy.—Considerable care is used in collecting these data and results are good.

Cooperation.—Daily discharge furnished by United States Reclamation Service, through A. N. Burch, project manager.

Daily discharge, in second-feet, of Little Stony Creek near Lodoga, Cal., for the year ending Sept. 30, 1915.

Day.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.
1	0.5	0.9	0.1	5.0	1,120	256	331	84	48	22	2.0	1.0
2	.5	.9	.4	5.0	4,760	236	287	103	38	22	2.0	.0
3	.5	.9	.0	6.0	2,780	206	246	82	43	26	2.0	.0
4	1.0	.9	1.9	2.0	976	195	293	102	44	22	2.0	.0
5	1.0	.9	11	2.7	600	183	208	81	46	22	2.0	.0
6	1.0	.9	6.4	62	415	173	181	78	44	22	2.0	.0
7	1.0	.9	5.0	24	315	166	161	88	44	22	2.0	.0
8	1.0	1.4	2.3	247	1,240	166	161	88	44	22	2.0	.0
9	1.0	1.4	11	527	2,540	153	156	90	35	22	2.0	.0
10	1.0	1.4	33	311	903	155	148	127	42	22	1.7	.0
11	1.0	1.4	53	166	604	153	149	298	38	5.6	1.7	.0
12	1.0	1.4	37	31	405	156	91	159	31	5.6	1.7	.0
13	1.0	1.4	24	85	332	147	104	150	34	5.6	1.5	.0
14	1.0	1.4	14	292	269	153	151	120	34	5.6	1.5	.0
15	1.0	1.9	14	185	226	136	125	143	36	5.6	1.5	.0
16	1.0	1.9	14	122	723	131	126	155	28	5.6	1.5	.0
17	1.0	1.9	7.9	75	1,070	131	138	152	30	5.6	1.5	.0
18	1.4	1.9	76	64	553	128	111	128	14	4.0	1.5	.0
19	1.4	1.9	68	49	375	103	122	82	26	4.0	1.2	.0
20	1.4	1.9	17	39	346	146	114	115	24	4.0	1.2	.0
21	1.4	1.9	31	46	308	121	142	80	27	4.0	1.2	.0
22	1.4	1.9	14	40	469	96	126	96	22	4.0	1.2	.0
23	1.4	1.9	8.5	40	377	109	114	81	27	4.0	1.2	.0
24	1.4	1.9	5.5	36	548	101	126	72	33	4.0	1.2	.0
25	1.4	1.9	3.0	40	627	128	98	70	27	2.2	1.0	.0
26	1.4	1.9	5.5	28	424	126	114	67	16	2.2	1.0	.0
27	1.4	1.9	11	335	340	122	98	74	23	2.2	1.0	.0
28	1.4	1.9	14	1,570	405	1,740	104	49	20	2.2	1.0	.0
29	1.4	.9	9.5	2,160	....	947	85	30	23	2.2	1.0	.0
30	1.4	.9	3.0	1,150	....	530	94	61	22	2.2	1.0	.0
31	1.4	....	5.0	614	....	430	....	58	....	2.2	1.0	....

Monthly discharge of Little Stony Creek near Lodoga, Cal., for the year ending Sept. 30, 1915.

[Drainage area, 102 square miles.]

Month.	Discharge in second-feet.				Run-off.	
	Maximum.	Minimum.	Mean.	Per square mile.	Depth in inches on drainage area.	Total in acre-feet.
October	1.4	0.5	1.13	0.011	0.01	69
November	1.9	.9	1.48	.015	.02	88
December	76	.0	16.3	.160	.18	1,000
January	2,160	2.0	270	2.65	3.06	16,600
February	4,760	226	859	8.42	8.77	47,700
March	1,740	96	249	2.44	2.81	15,300
April	331	85	147	1.44	1.61	8,750
May	298	30	102	1.00	1.15	6,270
June	48	14	32.1	.315	.35	1,910
July	22	2.2	9.89	.097	.11	608
August	2.0	1.0	1.49	.015	.02	92
September	1.0	.0	.03	.00029	.0003	2
The year	4,760	.0	136	1.33	18.09	98,400

NOTE.—Monthly and yearly discharge computed by engineers of the U. S. Geological Survey.

NORTH FORK OF FEATHER RIVER NEAR PRATTVILLE, CAL.

Location.—In sec. 28, T. 27 N., R. 8 E., below the Great Western Power Co.'s dam at Big Meadows, 4 miles above mouth of Butt Creek and about 5 miles southeast of Prattville, Plumas County.

Drainage area.—506 square miles above dam site.

Records available.—June 13, 1905, to September 30, 1915.

Gage.—Vertical staff in flume about 500 feet below the dam. Original gage was a Friez water-stage recorder located about on the south line of sec. 21 (above the dam). It was moved downstream about 1,300 feet April 29, 1912, and again about 2,200 feet downstream July 31, 1912. The Friez recorder was discontinued March 21, 1914, when the station was removed to present site. Original datum has not been maintained.

Discharge measurements.—Made in flume at gage.

Channel and control.—No information.

Extremes of discharge.—1905–1915: Maximum stage recorded, 16.2 feet, crest of flood, March 19, 1907 (discharge, 10,000 second-feet); no flow April 15 and 16, 1914 (water being stored).

Diversions.—No information.

Regulation.—Since March 7, 1914, the record shows the amount of water released from Big Meadows reservoir. There was 163,000 acre-feet of water in reservoir September 30, 1914, and 141,000 acre-feet September 30, 1915.

Cooperation.—Record of discharge and storage furnished by Great Western Power Co., through L. P. Cornell, engineer.

Daily discharge, in second-feet, of North Fork of Feather River near Prattville, Cal., for the year ending Sept. 30, 1915.

Day.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June.	July.	Aug.	Sept.
1	1,130	1,320	1,350	1,350	800	1,060	350	1,900	2,800	1,050	984	1,190
2	1,130	1,320	1,320	1,350	800	1,060	350	1,900	2,820	990	1,020	1,190
3	1,130	1,320	1,320	1,350	800	1,040	323	1,900	2,700	990	1,020	1,190
4	1,130	1,320	1,320	1,350	800	1,030	266	1,900	2,680	918	1,000	1,190
5	1,140	1,320	1,320	1,350	800	1,030	206	1,900	2,720	850	1,050	1,200
6	1,110	1,320	1,300	1,350	800	1,030	135	1,900	2,700	1,140	1,060	1,230
7	1,120	1,320	1,460	1,350	800	1,030	154	1,900	2,700	937	1,060	1,230
8	1,110	1,320	1,750	1,350	800	1,030	234	1,900	2,680	937	1,070	1,230
9	1,110	1,320	1,750	1,350	800	1,030	350	1,950	2,640	900	1,070	1,230
10	1,110	1,320	1,720	1,350	888	1,030	850	2,090	2,610	862	1,100	1,230
11	1,110	1,350	1,740	1,200	1,000	1,030	350	2,150	2,580	850	1,110	1,230
12	1,110	1,320	1,750	1,000	1,000	798	350	2,200	2,540	777	1,110	1,230
13	1,110	1,320	1,750	1,000	1,000	500	350	2,250	2,500	1,020	1,110	1,320
14	1,110	1,320	1,740	1,000	1,000	500	350	1,900	2,440	1,020	1,110	1,330
15	1,110	1,320	1,760	1,000	1,000	500	350	720	2,370	1,020	1,110	1,330
16	1,110	1,300	1,750	1,000	1,000	500	350	1,450	2,280	1,020	1,110	1,330
17	1,110	1,350	1,750	1,000	1,000	500	350	2,200	1,630	1,020	1,110	1,330
18	1,320	1,320	1,750	1,000	1,000	500	850	2,250	1,400	1,020	1,110	1,330
19	1,320	1,320	1,750	1,000	1,000	385	350	2,250	1,260	1,020	1,110	1,330
20	1,320	1,320	1,750	1,000	1,000	350	350	3,200	1,220	1,020	1,120	1,330
21	1,320	1,350	1,750	1,000	1,000	350	350	3,000	1,220	1,020	1,130	1,330
22	1,320	1,320	1,750	911	1,000	350	350	3,000	1,220	1,040	1,150	1,330
23	1,320	1,320	1,750	786	1,000	350	350	2,680	1,200	1,080	1,140	1,330
24	1,320	1,320	1,750	1,000	1,160	350	350	2,500	1,020	925	1,140	1.330
25	1,320	1,350	1,750	1,000	1,320	350	350	2,500	921	1,090	1,140	1,330
26	1,320	1,350	1,750	1,000	1,080	350	433	2,500	1,040	1,100	1,140	1,330
27	1,320	1,320	1,750	1,000	1,060	350	750	2,500	1,080	963	1,140	1,330
28	1,320	1,320	1,750	925	1,060	350	1,160	2,520	1,200	933	1,140	1,330
29	1,320	1,300	1,750	800	....	350	1,500	2,600	1,200	993	1,140	1,330
30	1,320	1,350	1,680	800	....	350	1,670	2.760	1,120	988	1,180	1,330
31	1,320	....	1,380	800	....	350	....	2,760	....	988	1,190	....

Monthly discharge of North Fork of Feather River near Prattville, Cal., for the year ending Sept. 30, 1915.

Month.	Discharge in second-feet.				Run-off (total in acre-feet).
	Maximum.	Minimum.	Mean.	Mean [a] stored in reservoir.	
October	1,320	1,110	1,210	− 460	74,400
November	1,350	1,300	1,320	− 635	78,600
December	1,760	1,300	1,640	− 811	101,000
January	1,350	786	1,090	− 278	67,000
February	1,320	800	956	+ 26	53,100
March	1,060	350	638	+ 799	39,200
April	1,670	135	449	+1,840	26,700
May	3,200	720	2,230	+ 836	137,000
June	2,820	921	1,950	− 273	116,000
July	1,140	777	983	− 285	60,400
August	1,190	984	1,100	− 481	67,600
September	1,330	1,190	1,280	− 599	76,200
The year	3,200	135	1,240	....	897,000

[a] The discharge in this column added to that in the column of "Means" gives the estimated unregulated discharge.

NOTE.—Monthly and yearly discharge, except monthly "Mean stored in reservoir," computed by engineers of the United States Geological Survey.

NORTH FORK OF FEATHER RIVER AT BIG BAR, CAL.

LOCATION.—In the NW. ¼ sec. 32, T. 23 N., R. 5 E., one-fourth mile above Big Bar station on Western Pacific Railroad, Butte County, and about 7 miles above intake of Great Western Power Co.'s power plant at Big Bend.

DRAINAGE AREA.—Not measured.

RECORDS AVAILABLE.—February 24, 1911, to September 30, 1915.

GAGE.—Bristol water-stage recorder. Original gage was a staff installed July, 1910, opposite the middle of Jesse Moore Bar. January 17, 1911, station was moved 300 feet upstream and the Bristol water-stage recorder was installed; gage datum, 1,347.96 feet above sea level (U. S. Geological Survey datum). In November, 1912, the Bristol gage was moved upstream 130 feet; datum of present gage, 1,348.96 feet above sea level.

DISCHARGE MEASUREMENTS.—Made from car and cable 20 feet upstream from gage.

CHANNEL AND CONTROL.—Solid rock, boulders, and gravel; practically permanent.

EXTREMES OF DISCHARGE:—1911–1915; Maximum mean daily discharge, 35,000 second-feet January 1, 1914; minimum mean daily discharge, 836 second-feet October 18, 1913.

DIVERSIONS.—No information.

REGULATION.—Flow partly regulated by Big Meadows reservoir (Lake Almanor).

COOPERATION.—Record furnished by Great Western Power Co., through L. P. Cornell, engineer.

Daily discharge, in second-feet, of North Fork of Feather River at Big Bar, Cal., for the year ending Sept. 30, 1915.

Day.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.
1	1,500	2,020	2,060	1,960	8,860	3,520	5,220	5,650	7,370	2,200	1,590	1,460
2	1,500	2,020	2,120	1,930	14,600	3,300	5,360	5,170	6,950	2,080	1,680	1,440
3	1,520	1,990	2,190	1,990	8,250	3,150	6,050	4,790	6,550	2,050	1,650	1,450
4	1,530	1,900	2,210	2,060	5,100	3,040	6,300	4,750	6,220	2,300	1,590	1,430
5	1,580	1,900	2,120	2,090	3,930	2,950	5,450	4,750	6,460	2,170	1,560	1,440
6	1,570	1,870	2,020	2,190	3,340	2,920	4,870	4,860	6,460	2,280	1,520	1,460
7	1,530	1,890	2,090	2,190	3,050	2,910	4,650	5,000	6,540	2,160	1,520	1,450
8	1,540	1,900	2,420	2,280	4,030	2,890	4,600	5,280	6,410	2,100	1,520	1,490
9	1,550	1,900	2,350	2,220	5,990	2,850	4,540	11,200	5,940	1,980	1,520	1,430
10	1,600	1,900	2,420	2,090	4,710	2,850	4,830	19,900	5,590	1,900	1,510	1,440
11	1,550	1,900	2,380	2,130	3,750	2,810	5,270	28,500	5,190	1,840	1,530	1,450
12	1,560	1,900	2,350	1,900	3,110	2,740	5,680	29,800	4,940	1,910	1,490	1,460
13	1,550	1,900	2,420	2,030	2,850	2,420	5,800	23,400	4,770	2,220	1,500	1,500
14	1,520	1,900	2,350	2,550	2,780	2,740	5,270	15,200	4,680	2,140	1,500	1,560
15	1,500	1,900	2,280	2,280	2,640	3,080	5,090	10,700	4,610	2,080	1,500	1,580
16	1,500	1,900	2,350	2,020	4,400	3,300	5,420	9,720	4,380	2,080	1,530	1,620
17	1,740	1,900	2,320	1,900	8,960	3,440	5,880	12,800	3,800	2,060	1,540	1,570
18	1,680	1,900	2,250	1,900	8,020	3,620	6,300	11,400	3,370	2,030	1,500	1,500
19	1,890	1,900	2,220	1,870	5,780	3,680	6,490	9,540	3,200	2,000	1,470	1,550
20	1,990	1,870	2,280	1,840	5,090	3,620	6,250	8,480	2,900	1,980	1,490	1,580
21	1,970	1,870	2,220	1,780	4,380	3,800	5,700	8,180	3,020	1,970	1,490	1,560
22	1,830	1,900	2,280	1,750	3,840	4,020	5,200	7,700	2,980	1,920	1,460	1,530
23	1,810	1,900	2,280	1,420	3,660	4,330	4,720	7,360	2,890	1,920	1,490	1,520
24	1,910	1,900	2,220	1,600	3,640	4,710	4,320	7,290	2,680	1,840	1,510	1,530
25	1,890	1,900	2,220	1,810	3,780	4,740	4,110	6,660	2,400	1,850	1,500	1,530
26	1,890	1,870	2,210	1,810	3,340	4,820	3,970	6,860	2,410	1,910	1,470	1,520
27	1,890	1,960	2,190	2,090	3,390	5,040	4,630	7,320	2,410	1,850	1,430	1,530
28	1,870	2,190	2,210	2,700	3,600	8,970	5,410	7,480	2,440	1,730	1,430	1,560
29	1,880	2,120	2,220	2,790	....	8,960	6,420	7,230	2,440	1,640	1,450	1,580
30	1,900	2,090	2,210	3,080	....	6,880	6,160	7,110	2,420	1,640	1,440	1,530
31	1,900	....	2,150	3,150	....	5,620	....	7,220	....	1,640	1,500	....

NOTE.—No record Oct. 19 to 24. Discharge estimated by U. S. Geological Survey from interpolated values of the sum of the discharge at the station and the water released from Big Meadows reservoir. Company furnished a record of water released covering this period.

Monthly discharge of North Fork of Feather River at Big Bar, Cal., for the year ending Sept. 30, 1915.

Month.	Discharge in second-feet.			Run-off (total in acre-feet).
	Maximum.	Minimum.	Mean.	
October	1,990	1,500	1,700	105,000
November	2,190	1,870	1,930	115,000
December	2,420	2,020	2,250	138,000
January	3,150	1,420	2,110	130,000
February	14,600	2,640	4,960	275,000
March	8,970	2,420	3,990	245,000
April	6,490	3,970	5,330	317,000
May	29,800	4,750	10,000	615,000
June	7,370	2,400	4,410	262,000
July	2,300	1,640	1,980	122,000
August	1,680	1,430	1,510	92,800
September	1,620	1,430	1,510	89,900
The year	29,800	1,420	3,470	2,510,000

NOTE.—Monthly and yearly discharge computed by engineers of the U. S. Geological Survey. For amount of regulation at Big Meadows reservoir, see monthly-discharge table for station near Prattville, page 238.

FEATHER RIVER AT OROVILLE, CAL.

LOCATION.—In sec. 8, T. 19 N., R. 4 E., at highway bridge at Oroville, Butte County, 6 miles below junction of North and Middle forks, and 30 miles above the mouth of Yuba River.

DRAINAGE AREA.—3,640 square miles.

RECORDS AVAILABLE.—January 1, 1902 to September 30, 1915.

Gage.—Friez water-stage recorder on right bank 200 feet below bridge, at same datum as United States Weather Bureau vertical staff which is in two sections on pier of highway bridge near right bank. Weather Bureau gage was used 1902 to 1905 with 2 feet added to the readings to reference them to the datum of the U. S. Geological Survey staff gage installed on left bank about 1,000 feet above the bridge in December, 1905. The latter gage was washed out several times and until repaired the Weather Bureau gage was used. December 16, 1912 the present water-stage recorder was put in operation.

Discharge measurements.—Made from car and cable 1,000 feet above bridge. At extremely low water measurements have been made from a boat about 1,000 feet below the bridge.

Channel and control.—Composed of boulders and gravel; somewhat shifting during high water.

Extremes of discharge.—Maximum stage during year from water-stage recorder, 16.3 feet at 2 p. m. May 11 (discharge, 112,000 second-feet); minimum stage from water-stage recorder, 0.88 foot at 8.30 a. m. September 7 (discharge, 1,410 second-feet).

1902–1915: Maximum stage recorded, 30.2 feet Weather Bureau gage; 39.3 feet on gage 1,000 feet upstream, March 19, 1907 (discharge 187,000 second-feet); minimum stage from water-stage recorder, —0.13 foot at 10 a. m. October 7, 1913 (discharge, 790 second-feet).

Diversions.—None.

Regulation.—The operation of the Big Bend plant of the Great Western Power Co. causes diurnal fluctuation in stage, especially during extremely low water, when it amounts to about a foot. See also North Fork of Feather River near Prattville, Col.

Accuracy.—Results excellent.

Daily discharge, in second-feet, of Feather River at Oroville, Cal., for the year ending Sept. 30, 1915.

Day.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.
1	1,800	2,290	2,570	2,460	35,900	11,400	15,800	14,100	17,000	4,220	2,370	1,970
2	1,800	2,520	2,630	2,460	59,400	10,000	15,200	11,900	16,400	4,090	2,420	1,970
3	1,840	2,400	3,170	2,460	29,600	8,800	17,000	10,400	14,600	3,910	2,370	2,020
4	1,800	2,290	3,230	2,870	17,000	8,110	17,500	10,000	14,100	3,790	2,320	2,020
5	1,890	2,290	3,560	2,810	11,400	8,110	15,800	10,000	13,500	3,610	2,270	1,920
6	1,840	2,240	3,110	3,490	8,800	7,490	13,500	10,400	13,500	3,550	2,220	1,920
7	1,800	2,180	3,110	3,620	7,790	7,490	13,000	10,900	13,500	3,670	2,170	1,970
8	1,760	2,130	3,050	5,410	14,600	6,910	13,000	12,400	13,500	3,490	2,220	2,020
9	1,800	2,240	3,110	4,830	24,400	6,910	12,400	23,600	12,400	3,370	2,270	1,980
10	1,980	2,180	3,420	3,680	19,300	6,910	13,500	61,600	11,400	3,310	2,170	2,320
11	1,980	2,180	4,100	3,420	14,100	6,630	14,100	91,000	10,400	3,080	2,220	1,970
12	1,890	2,240	3,750	3,620	10,000	6,630	15,800	83,700	9,580	3,080	2,270	2,120
13	1,840	2,180	3,360	4,410	8,110	6,370	17,000	60,500	8,800	3,130	2,220	2,420
14	1,800	2,240	3,170	7,490	6,910	6,910	15,200	41,500	8,450	3,250	2,170	2,370
15	1,710	2,240	2,990	5,210	6,370	7,790	14,600	30,500	8,110	3,190	2,120	2,270
16	1,710	2,460	2,990	4,030	10,000	8,450	15,800	27,000	7,790	3,130	2,170	2,220
17	1,890	2,290	3,050	3,420	29,600	8,800	17,000	37,700	7,190	3,020	2,120	2,170
18	2,400	2,400	3,110	3,110	27,000	9,580	18,100	37,700	6,370	2,960	2,120	2,120
19	2,630	2,400	3,070	2,990	18,700	10,400	18,100	30,500	6,110	2,960	2,120	2,020
20	3,420	2,400	3,030	2,870	15,800	10,000	18,700	24,400	5,670	2,860	2,070	2,070
21	2,630	2,290	2,990	2,810	13,000	9,580	16,400	22,000	5,490	2,800	1,970	2,020
22	2,290	2,290	2,870	2,750	12,400	10,000	15,200	19,900	5,490	2,800	2,070	2,070
23	2,240	2,400	2,870	2,630	12,400	10,900	13,500	19,300	5,330	2,740	2,070	2,070
24	2,130	2,400	2,870	2,290	13,000	11,900	11,900	19,300	5,180	2,910	2,070	2,120
25	2,080	2,400	2,750	2,990	13,000	11,900	10,900	17,000	4,820	2,640	2,070	2,020
26	2,180	2,460	2,810	3,230	10,900	12,400	10,000	16,400	4,610	2,740	2,070	2,020
27	2,130	2,570	2,750	4,180	10,000	12,400	10,900	18,100	4,540	2,690	2,020	2,120
28	2,080	3,230	2,690	11,400	11,900	26,200	13,500	18,100	4,480	2,520	2,020	2,070
29	2,130	2,870	2,630	11,900	......	30,500	17,000	18,100	4,480	2,470	1,970	2,270
30	2,240	2,690	2,630	10,900	......	22,800	17,000	17,000	4,350	2,470	2,020	2,320
31	2,290	......	2,630	11,900	......	18,100	......	17,000	......	2,470	1,970	......

Note.—Discharge determined from two well-defined rating curves, the change occurring May 11. Discharge Dec. 19 and 20 interpolated.

Monthly discharge of Feather River at Oroville, Cal., for the year ending Sept. 30, 1915.

[Drainage area, 3,640 square miles.]

Month.	Discharge in second-feet.				Run-off.		Accuracy.
	Maximum.	Minimum.	Mean.	Per square mile.	Depth in inches on drainage area.	Total in acre-feet.	
October	3,420	1,710	2,060	0.566	0.65	127,000	A.
November	3,230	2,130	2,380	.654	.73	142,000	A.
December	4,100	2,570	3,030	.832	.96	186,000	A.
January	11,900	2,290	4,570	1.26	1.45	281,000	A.
February	59,400	6,370	16,800	4.62	4.81	933,000	A.
March	30,500	6,370	11,000	3.02	3.48	676,000	A.
April	18,700	10,000	14,900	4.09	4.56	887,000	A.
May	91,000	10,000	27,200	7.47	8.61	1,670,000	A.
June	17,000	4,350	8,900	2.45	2.73	530,000	A.
July	4,220	2,470	3,130	.860	.99	192,000	A.
August	2,420	1,970	2,150	.591	.68	132,000	A.
September	2,420	1,920	2,090	.574	.64	124,000	A.
The year	91,000	1,710	8,130	2.23	30.29	5,880,000	

BUTT CREEK AT BUTTE VALLEY, CAL.

Location.—At lower end of Butte Valley, 100 feet below footbridge, 1,000 feet above intake to the Great Western Power Co.'s diversion flume, about one-fourth mile south of Butte Valley post office, Plumas County, and 2 miles above junction with North Fork of Feather River.

Drainage area.—73 square miles at original station.

Records available.—June 14, 1905, to September 30, 1915.

Gage.—Vertical staff on left bank, installed July 19, 1912, seven-eighths of a mile upstream from original vertical staff, which was on right bank. This gage is out of the influence of the low-water diversion dam near the flume intake for the Great Western Power Co.'s Butt Creek plant.

Discharge measurements.—Made from footbridge at gage.

Channel and control.—Sand, gravel, and clay; appear permanent.

Extremes of discharge.—1905–1915: Maximum mean daily discharge, 1,640 second-feet January 16, 1909; minimum mean daily discharge, 21 second-feet August 4 to 8, 1908.

Diversions.—Water is diverted from Butt Creek above the station into Yellow Creek watershed through Wallack ditch by the Oro Light & Power Co. The ditch has a capacity of from 15 to 20 second-feet.

Regulation.—No information.

Cooperation.—Record furnished by Great Western Power Co., through L. P. Cornell, engineer.

Daily discharge, in second-feet, of Butt Creek at Butte Valley, Cal., for the year ending Sept. 30, 1915.

Day.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept
1	47	56	50	62	149	103	261	300	306	81	50	39
2	48	55	51	59	189	97	274	274	286	77	48	39
3	50	54	46	64	171	93	321	237	264	74	48	39
4	48	53	54	62	124	95	324	227	248	72	48	39
5	50	52	62	55	119	101	281	230	240	71	48	39
6	48	51	61	45	114	107	274	231	237	71	48	38
7	47	50	58	39	97	99	278	234	240	70	48	38
8	50	50	55	36	105	98	296	264	235	70	48	38
9	50	48	58	46	116	101	287	371	227	69	48	38
10	57	48	55	42	119	94	317	494	206	68	48	38
11	53	48	56	44	114	101	335	552	194	67	48	37
12	50	47	58	42	107	103	375	573	178	64	48	37
13	47	47	60	63	94	110	364	481	163	63	48	37
14	47	48	58	64	82	130	359	435	151	62	46	40
15	47	46	57	63	76	157	352	389	149	61	45	40
16	46	46	60	62	146	173	367	377	141	60	45	39
17	58	47	59	63	232	189	403	429	137	59	44	38
18	59	46	58	44	226	199	397	393	130	58	44	38
19	66	45	55	41	180	206	421	373	124	57	43	37
20	71	45	55	47	159	207	422	315	118	56	43	37
21	58	46	56	45	124	208	386	312	112	55	42	37
22	54	46	58	42	116	233	383	304	106	54	42	37
23	52	46	59	30	104	261	353	297	101	53	42	38
24	50	46	57	35	103	273	422	309	98	55	42	38
25	48	46	56	42	108	278	420	299	97	54	42	38
26	48	45	60	52	104	292	286	260	94	52	42	38
27	50	47	67	60	101	262	303	264	92	51	42	39
28	48	69	63	66	103	378	338	286	90	51	41	39
29	50	60	64	68	......	416	399	312	86	50	40	39
30	55	53	60	67	......	310	362	302	84	50	39	39
31	53	......	62	63	......	264	......	299	......	50	39	......

Monthly discharge of Butt Creek at Butte Valley, Cal., for the year ending Sept. 30, 1915.

Month.	Discharge in second-feet.			Run-off (total in acre-feet).
	Maximum.	Minimum.	Mean.	
October	71	46	51.8	3,190
November	69	45	49.5	2,950
December	67	46	57.7	3,550
January	68	30	52.0	3,200
February	232	76	128	7,110
March	416	93	185	11,400
April	422	261	345	20,500
May	573	227	336	20,700
June	306	84	164	9,760
July	81	50	61.4	3,780
August	50	39	44.8	2,750
September	40	37	38.2	2,270
The year	573	30	126	91,200

NOTE.—Monthly and yearly discharge computed by engineers of the U. S. Geological Survey.

INDIAN CREEK NEAR CRESCENT MILLS, CAL.

LOCATION.—In the SW. ¼ sec. 25, T. 26 N., R. 9 E., at the lower end of Indian Valley, about 2,000 feet below Arlington Bridge, and 1¼ miles below Crescent Mills, Plumas County. Spanish Creek enters 4 miles below the station.

DRAINAGE AREA.—740 square miles.

RECORDS AVAILABLE.—January 1, 1906, to December 31, 1909, and September 10, 1911, to September 30, 1915.

GAGE.—Vertical staff in three sections on right bank near observer's house, read once a day by Eugene Cook.

Discharge measurements.—Made from car and cable, 30 feet below gage or by wading.

Channel and control.—Composed of gravel and small boulders; fairly permanent. At low stages water is deep and sluggish at gage.

Extremes of discharge.—Maximum stage recorded during year, 10.9 feet at 5 p. m. May 12 (discharge, 7,040 second-feet, computed from extension of rating curve and may be subject to error); minimum stage recorded, 0.98 foot, August 6 to 11 (discharge, 22 second-feet).

1906–1915: Maximum stage recorded, 20.2 feet at 6.30 a. m., crest of flood of March 19, 1907 (discharge, 11,700 second-feet, computed from extension of rating curve and may be subject to error); minimum stage recorded, 0.75 foot, August 9 to 15, 1908 (discharge, 12 second-feet).

Diversions.—Water is diverted from Indian Creek for irrigation in Indian and Genesee valleys.

Regulation.—None.

Accuracy.—Results good.

Discharge measurements of Indian Creek near Crescent Mills, Cal., during the year ending Sept. 30, 1915.

[Made by H. J. Tompkins.]

Date.	Gage height.	Discharge.	Date.	Gage height.	Discharge.
	Feet.	*Sec.-ft.*		*Feet.*	*Sec.-ft.*
Mar. 14	3.47	401	Aug. 12	0.98	25
31	5.64	1,680			

Daily discharge, in second-feet, of Indian Creek near Crescent Mills, Cal., for the year ending Sept. 30, 1915.

Day.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.
1	50	96	108	120	865	645	1,720	995	805	126	40	29
2	56	96	108	120	2,130	560	1,800	865	750	120	36	29
3	61	96	108	126	1,490	484	2,130	865	695	114	31	29
4	61	96	114	133	930	450	2,130	865	600	110	27	29
5	63	96	120	146	560	450	1,880	865	560	108	23	31
6	66	96	123	152	450	418	1,490	865	520	106	22	34
7	66	96	126	159	360	388	1,340	865	484	102	22	36
8	66	96	130	166	865	388	1,270	865	450	102	22	37
9	72	96	130	172	1,490	388	1,200	930	450	102	22	40
10	72	96	133	172	995	388	1,200	1,800	388	102	22	43
11	72	96	133	179	695	386	1,340	4,040	334	96	22	45
12	72	96	133	186	520	388	1,420	7,030	310	90	23	43
13	72	96	126	200	450	388	1,560	6,010	278	84	23	40
14	72	96	120	216	388	450	1,340	4,140	250	78	23	37
15	72	94	120	208	334	560	1,130	3,050	232	72	25	36
16	72	94	120	200	334	695	1,130	2,040	224	66	25	34
17	72	90	120	186	865	750	1,270	2,300	216	61	25	31
18	78	86	120	172	1,640	865	1,340	1,960	200	59	25	29
19	78	86	120	159	1,130	865	1,420	1,800	186	59	27	29
20	84	84	120	159	750	865	1,340	1,490	179	56	27	29
21	84	84	120	152	695	930	1,340	1,340	172	56	27	29
22	84	84	120	146	600	1,060	1,200	1,200	166	56	27	29
23	84	84	120	140	600	1,200	1,060	1,060	159	52	27	29
24	84	84	120	133	520	1,490	865	995	152	52	27	29
25	84	84	120	146	520	1,640	865	930	146	50	29	29
26	84	84	120	152	520	1,800	865	865	146	50	29	31
27	84	96	120	172	520	1,560	865	865	146	48	29	31
28	84	120	120	200	600	1,880	865	865	140	48	29	31
29	84	114	120	268	....	2,670	930	865	133	45	29	34
30	90	108	120	310	....	1,960	1,200	865	133	42	29	34
31	96	....	120	360	....	1,640	....	865	....	42	29	....

Note.—Discharge determined from a rating curve well defined between 100 and 4,000 second-feet.

Monthly discharge of Indian Creek near Crescent Mills, Cal., for the year ending Sept. 30, 1915.

Month.	Discharge in second-feet.			Run-off (total in acre-feet).	Accuracy.
	Maximum.	Minimum.	Mean.		
October	96	50	74.8	4,600	B.
November	120	84	94.0	5,590	B.
December	133	108	121	7,440	A.
January	360	120	178	10,900	A.
February	2,130	334	779	43,300	A.
March	2,670	388	923	56,800	B.
April	2,130	865	1,320	78,600	B.
May	7,030	865	1,750	108,000	B.
June	805	133	320	19,000	A.
July	126	42	75.9	4,670	B.
August	40	22	26.5	1,630	C.
September	45	29	33.2	1,980	C.
The year	7,030	22	472	343,000	

SPANISH CREEK AT KEDDIE, CAL.

Location.—In the SW. ¼ sec. 22, T. 25 N., R. 9 E., at highway bridge at Keddie, Plumas County, 2 miles above junction with Indian Creek.

Drainage area.—Not measured.

Records available.—October 22, 1911, to September 30, 1915.

Gage.—Vertical staff in three sections, read once a day by C. O. Phillips. First section is on right bank 50 feet above bridge; second section on left bank 20 feet downstream from bridge; third section fastened to downstream side of left bridge pier. Previous to August 12, 1914, high-water section was painted on left abutment of bridge; low-water section was vertical staff fastened to a stump on left bank 20 feet below bridge.

Discharge measurements.—Made from downstream side of bridge or by wading.

Channel and control.—Gravel; shifts during high water.

Extremes of discharge.—Maximum stage recorded during year, 9.2 feet on morning of May 11 (discharge, 8,470 second-feet); minimum stage recorded, 1.2 feet September 1 to 10 (discharge, 33 second-feet).

1911–1915: Maximum stage recorded, 10.0 feet at 11 a. m. December 31, 1913, and at 1 p. m. January 2, 1914 (discharge, 9,450 second-feet, determined from extension of rating curve and may be subject to error); minimum stage recorded, 1.1 feet July 24 to 30, 1914 (discharge, 22 second-feet).

Diversions.—Water is diverted from Spanish Creek for irrigation in American Valley.

Regulation.—None.

Accuracy.—Results good.

Discharge measurements of Spanish Creek at Keddie, Cal., during the year ending Sept. 30, 1915.

[Made by H. J. Tompkins.]

Date.	Gage height.	Discharge.	Date.	Gage height.	Discharge.
	Feet.	*Sec.-ft.*		*Feet.*	*Sec.-ft.*
Mar. 14	3.10	431	Aug. 12	1.30	41
31	3.70	749			

Daily discharge, in second-feet, of Spanish Creek at Keddie, Cal., for the year ending Sept. 30, 1915.

Day.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.
1	44	60	72	78	2,390	432	820	598	545	116	50	33
2	44	60	72	84	7,050	432	820	432	520	116	50	33
3	46	60	105	84	2,020	394	975	394	474	108	50	33
4	48	60	105	98	625	394	935	453	432	108	50	33
5	48	60	78	98	474	394	785	394	394	108	50	33
6	48	60	84	105	313	394	750	394	394	100	41	33
7	49	60	91	105	298	377	718	453	394	100	41	33
8	49	60	91	105	935	895	625	497	360	100	41	33
9	60	60	87	105	1,240	394	625	858	377	93	41	33
10	60	60	84	98	895	360	625	3,080	394	93	41	33
11	49	60	84	98	453	360	685	8,470	298	86	41	37
12	49	60	84	98	394	394	895	7,790	270	86	41	41
13	49	60	84	98	360	394	935	3,800	256	86	41	41
14	49	60	78	295	344	432	750	2,270	256	86	41	41
15	72	60	60	127	298	520	785	1,560	242	80	41	41
16	72	60	78	127	394	545	820	1,560	229	80	37	41
17	72	60	72	105	3,360	545	820	1,670	216	80	37	46
18	72	60	72	98	1,780	570	820	1,340	204	74	37	46
19	72	60	78	91	975	625	935	975	192	74	37	46
20	72	60	91	84	935	625	895	895	192	74	37	46
21	54	60	98	84	570	570	895	820	170	74	37	41
22	54	60	98	84	570	685	750	625	160	74	37	41
23	54	60	98	84	497	718	685	625	150	74	37	41
24	49	60	98	91	474	785	625	625	141	74	37	41
25	54	49	98	91	497	785	570	570	141	68	37	41
26	54	60	84	98	453	820	570	570	132	68	37	41
27	54	72	84	98	432	820	520	570	124	62	37	41
28	54	112	72	153	570	3,080	598	545	124	62	37	41
29	54	98	72	200	....	1,780	625	570	116	50	37	41
30	72	84	72	245	....	975	598	520	116	50	37	41
31	72	....	78	258	....	750	....	520	....	50	37	....

NOTE.—Discharge determined from two rating curves as follows: Oct. 1 to Feb. 2, well defined below 2,000 second-feet; Feb. 3 to Sept. 30, well defined below 1,000 second-feet. Discharge July 16 interpolated.

Monthly discharge of Spanish Creek at Keddie, Cal., for the year ending Sept. 30, 1915.

Month.	Discharge in second-feet.			Run-off (total in acre-feet).	Accuracy.
	Maximum.	Minimum.	Mean.		
October	72	44	56.4	3,470	B.
November	112	49	63.8	3,800	B.
December	105	60	83.9	5,160	B.
January	295	78	118	7,260	B.
February	7,050	298	1,060	58,900	C.
March	3,080	360	685	42,100	B.
April	975	520	748	44,500	A.
May	8,470	394	1,430	87,900	C.
June	545	116	267	15,900	A.
July	116	50	82.4	5,070	B.
August	50	37	40.4	2,480	B.
September	46	33	38.9	2,310	B.
The year	8,470	33	385	279,000	

MIDDLE FORK OF FEATHER RIVER NEAR CROMBERG, CAL.

Location.—Half a mile above Sloat station on Western Pacific Railroad, three-fourths mile above mouth of Poplar Creek, and about 1½ miles below Cromberg, Plumas County.

Drainage area.—Not measured.

Records available.—November 3, 1910, to September 30, 1915.

Gage.—Gurley electric water-stage recorder on right bank installed December 5, 1913. Original gage located at California White Pine Co.'s log chute at Cromberg. Several changes in gage at that location were made. All were on downstream side of log chute piers and original datum maintained. New location has different datum. During construction of recorder well (Pl. VIII, A), November 9 to December 4, 1913, a staff gage was read at new location, new datum.

Discharge measurements.—Made from car and cable 1 mile above gage, or by wading.

Channel and control.—Boulders and gravel, appear fairly permanent. Left bank, flat and timbered, will be submerged at flood stages.

Extremes of discharge.—Maximum stage during year from water-stage recorder, 7.48 feet, May 12 (discharge, 5,570 second-feet); minimum stage, 2.57 feet at noon, August 31 (discharge, 48 second-feet).

1910–1915: Maximum stage recorded, 13.0 feet, April 7, 1911 (discharge, 9,640 second-feet); minimum stage recorded, 2.2 feet, September 17 to 29, 1913 (discharge, 44 second-feet).

Winter flow.—Stage-discharge relation slightly affected by ice for very short periods.

Diversions.—None.

Regulation.—None.

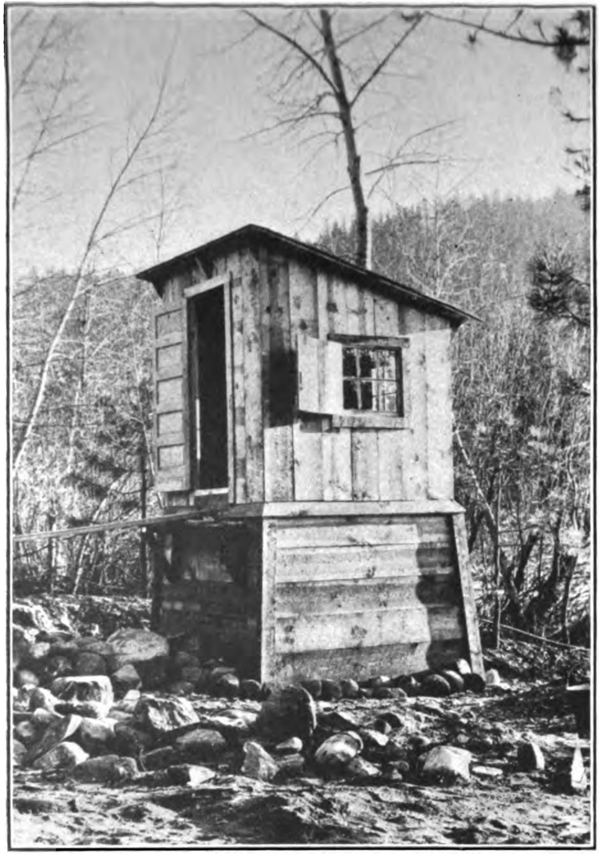
Accuracy.—Results good.

Discharge measurements of Middle Fork of Feather River near Cromberg, Cal., during the year ending Sept. 30, 1915.

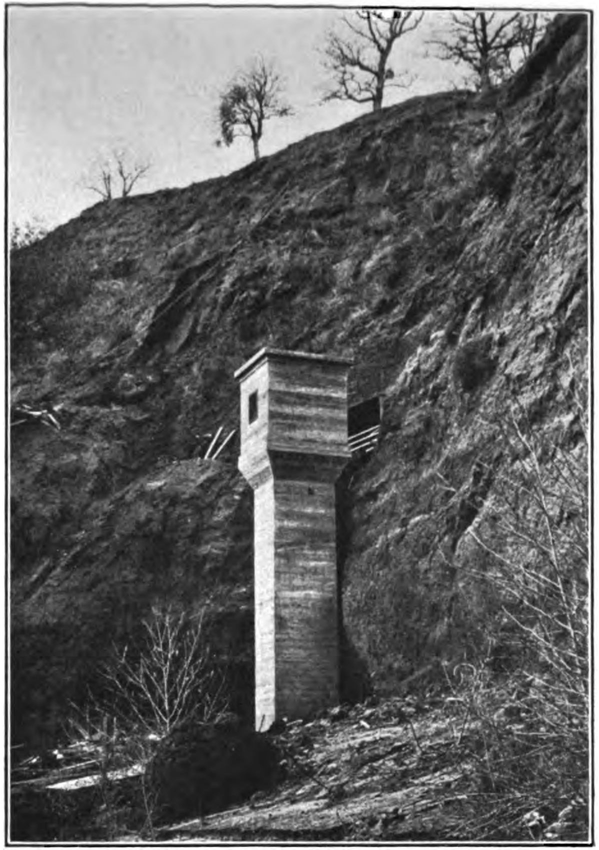
[Made by H. J. Tompkins.]

Date.	Gage height.	Discharge.	Date.	Gage height.	Discharge.	Date.	Gage height.	Discharge.
	Feet.	*Sec.-ft.*		*Feet.*	*Sec.-ft.*		*Feet.*	*Sec.-ft.*
Jan. 14	[a] 3.52	214	Mar. 12	4.28	753	Mar. 30	5.00	1,440
15	3.00	131	13	4.52	953	Aug. 1	2.80	80

[a] Ice on control and at measuring section.



A. WELL AND SHELTER ON MIDDLE FORK OF FEATHER RIVER AT CROMBERG, CAL.



B. REINFORCED CONCRETE WELL AND GAGE HOUSE ON AMERICAN RIVER AT FAIROAKS, CAL.

Daily discharge, in second-feet, of Middle Fork of Feather River near Cromberg, Cal., for the year ending Sept. 30, 1915.

Day.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.
1	63	87	85	95	420	732	1,190	730	930	226	74	51
2	63	83	87	102	894	683	1,180	690	858	214	72	51
3	68	75	102	108	410	634	1,410	697	746	208	70	52
4	66	72	110	130	290	662	1,450	725	718	189	68	52
5	66	72	110	120	258	718	1,310	792	704	172	66	52
6	66	70	98	122	274	718	1,080	760	704	166	64	52
7	66	69	102	110	302	746	1,160	768	732	166	62	52
8	68	69	85	100	354	753	1,120	753	732	157	61	53
9	70	70	89	87	620	760	1,120	1,330	676	151	60	53
10	79	95	98	87	490	784	1,160	2,850	620	145	59	52
11	72	81	91	85	380	800	1,230	4,750	532	142	58	52
12	69	77	87	87	318	792	1,390	4,340	466	140	58	52
13	68	77	83	100	274	957	1,360	2,850	420	135	58	53
14	68	81	85	214	258	1,190	1,060	2,320	415	125	57	57
15	68	79	79	120	266	1,390	1,100	2,180	420	118	56	56
16	68	79	93	95	380	1,480	1,220	1,960	395	112	57	55
17	79	79	91	102	876	1,480	1,250	1,780	380	108	56	54
18	85	79	87	87	768	1,500	1,250	1,560	370	100	56	54
19	105	77	91	87	697	1,430	1,260	1,430	350	98	55	53
20	110	75	87	83	697	1,360	1,220	1,240	330	95	55	53
21	87	75	81	83	676	1,310	1,060	1,110	314	91	54	53
22	79	75	85	79	655	1,240	984	1,070	298	105	53	53
23	75	75	87	72	613	1,230	894	1,030	298	98	53	53
24	74	75	83	87	585	1,230	808	1,000	286	91	56	53
25	74	77	89	87	599	1,260	760	885	270	87	57	54
26	72	77	95	89	648	1,210	648	876	250	81	55	55
27	72	79	95	100	669	1,090	746	966	242	79	54	54
28	72	89	91	108	768	1,430	832	1,000	238	77	53	54
29	74	87	95	120	....	1,460	921	984	234	75	53	53
30	81	85	95	128	....	1,430	840	912	234	74	52	53
31	83	....	98	128	....	1,290	....	894	....	74	50	......

NOTE.—Discharge determined from a well-defined rating curve. Stage-discharge relation affected by ice Jan. 14; discharge estimated from discharge measurement. No record Aug. 2-10; discharge interpolated.

Monthly discharge of Middle Fork of Feather River, near Cromberg, Cal., for the year ending Sept. 30, 1915.

Month.	Discharge in second-feet.			Run-off (total in acre-feet).	Accuracy.
	Maximum.	Minimum.	Mean.		
October	110	63	74.5	4,580	B.
November	95	69	78.0	4,640	B.
December	110	79	91.4	5,620	B.
January	214	72	103	6,330	B.
February	894	258	516	28,700	A.
March	1,500	634	1,090	67,000	A.
April	1,450	648	1,100	65,500	A.
May	4,750	690	1,460	89,800	A.
June	930	234	472	28,100	A.
July	226	74	126	7,750	B.
August	74	50	58.5	3,600	B.
September	57	51	53.1	3,160	B.
The year	4,750	50	434	315,000	

MIDDLE FORK OF FEATHER RIVER NEAR OROVILLE, CAL.

LOCATION.—In the NW. ¼ sec. 32, T. 20 N., R. 5 E., at highway bridge at Bidwell Bar, 2 miles above junction with the North Fork, and 7 miles northeast of Oroville, Butte County. South Fork enters 1¼ miles above and Canyon Creek three-fourths of a mile below the station.

DRAINAGE AREA.—Not measured.

RECORDS AVAILABLE.—October 7, 1911, to September 30, 1915.

Gage.—Vertical staff in three sections, read once a day by T. W. Curry. High-water section is fastened to lower end of bridge pier near left bank. Remainder of gage is fastened to a sycamore tree on left bank, 100 feet above bridge.

Discharge measurements.—Made from car and cable installed April 1, 1914, 250 feet below bridge.

Channel and control.—Boulder and gravel; fairly permanent.

Extremes of discharge.—Maximum stage recorded during year, 15.5 feet at noon, May 11 (discharge, 25,300 second-feet, computed from extension of rating curve and may be subject to error); minimum stage recorded, 2.20 feet, October 1 and 2 (discharge, 255 second-feet).

1911–1915: Maximum stage recorded, 18.0 feet at 4 p. m., December 31, 1913 (discharge, 34,200 second-feet, computed from extension of rating curve and may be subject to error); minimum stage recorded, 2.18 feet, September 24–25, 1913 (discharge, 177 second-feet).

Diversions.—The Palermo Land & Water Co.'s canal and South Feather Land & Water Co.'s canal divert from South Fork of Feather River and tributaries.

Regulation.—None.

Accuracy.—Results good.

Discharge measurements of Middle Fork of Feather River near Oroville, Cal., during the year ending Sept. 30, 1915.

[Made by Charles Leidl.]

Date.	Gage height.	Discharge.
	Feet.	*Sec.-ft.*
Feb. 7	5.31	2,060
Apr. 14	7.98	5,640

Daily discahrge, in second-feet, of Middle Fork of Feather River near Oroville, Cal., for the year ending Sept. 30, 1915.

Day.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.
1	255	360	360	360	7,300	3,310	5,470	4,970	5,300	1,150	460	280
2	255	390	330	360	14,600	3,050	5,300	4,180	5,130	1,080	460	275
3	280	375	585	360	6,730	2,800	5,820	3,730	4,650	1,020	442	280
4	280	330	500	500	4,180	2,560	6,540	3,450	4,330	1,020	425	275
5	275	330	540	425	3,050	2,560	5,820	3,450	4,180	960	425	275
6	268	318	500	630	2,340	2,560	5,300	3,450	4,030	960	408	275
7	268	318	500	562	2,040	2,560	5,130	3,730	4,030	960	390	275
8	268	310	442	900	3,050	2,560	5,130	4,330	3,880	900	390	275
9	285	310	460	785	6,730	2,560	4,970	5,130	3,590	900	390	268
10	305	310	500	585	5,130	2,450	5,300	12,700	3,310	840	390	268
11	330	310	730	480	3,590	2,340	5,640	23,600	3,050	840	375	260
12	305	318	520	608	2,800	2,340	6,360	22,000	2,680	785	375	260
13	290	318	442	630	2,140	2,560	6,540	15,600	2,450	785	360	275
14	275	330	390	2,240	1,940	2,920	5,820	12,000	2,340	730	360	280
15	275	318	345	1,290	1,860	3,450	5,470	10,200	2,240	730	360	280
16	268	318	390	900	1,940	3,880	6,000	9,540	2,140	680	345	285
17	280	310	425	680	7,680	4,030	6,730	11,100	2,040	655	330	280
18	500	310	425	585	6,920	4,330	6,920	11,100	1,940	630	330	275
19	390	305	390	520	5,300	4,330	7,300	9,760	1,860	630	330	268
20	705	305	500	500	4,970	4,180	7,110	8,280	1,760	608	325	260
21	460	305	390	460	3,880	4,180	6,540	7,110	1,680	585	318	255
22	375	305	375	460	3,880	4,330	5,820	6,730	1,600	585	310	255
23	330	305	390	425	3,880	4,490	5,470	6,540	1,520	540	305	255
24	330	305	375	425	3,880	4,810	4,810	7,110	1,520	540	305	255
25	318	305	360	540	3,880	4,810	4,490	5,820	1,440	540	305	255
26	310	305	360	608	3,450	4,810	4,180	5,640	1,360	520	305	255
27	305	305	375	730	3,310	4,330	4,490	6,000	1,290	500	305	268
28	305	785	375	2,800	3,730	7,490	5,300	6,180	1,220	500	305	268
29	305	425	345	2,340	....	8,480	6,000	6,180	1,220	480	285	268
30	360	390	360	2,340	....	6,540	6,180	5,640	1,150	480	280	260
31	360	....	345	2,680	....	5,820	....	5,470	....	460	280	....

Note.—Discharge determined from a rating curve well defined below and extended above 10,000 second-feet.

Monthly discharge of Middle Fork of Feather River near Oroville, Cal., for the year ending Sept. 30, 1915.

Month.	Discharge in second-feet.			Run-off (total in acre-feet).	Accuracy.
	Maximum.	Minimum.	Mean.		
October	705	255	326	20,000	A.
November	785	305	341	20,300	A.
December	730	330	430	26,400	A.
January	2,800	360	894	55,000	A.
February	14,600	1,860	4,440	247,000	B.
March	8,480	2,340	3,920	241,000	A.
April	7,300	4,180	5,730	341,000	A.
May	23,600	3,450	8,090	497,000	B.
June	5,300	1,150	2,630	156,000	A.
July	1,150	460	729	44,800	A.
August	460	280	354	21,800	A.
September	285	255	269	16,000	B.
The year	23,600	255	2,330	1,690,000	

SOUTH FORK OF FEATHER RIVER AT ENTERPRISE, CAL.

Location.—In the NE. ¼ sec. 1, T. 19 N., R. 6 E., one-half mile above highway bridge at Enterprise, Butte County, about 800 feet above mouth of Powell Creek.

Drainage area.—Not measured.

Records available.—October 8, 1911, to September 30, 1915.

Gage.—Inclined staff, read once a day by Gus Alm. It is bolted to ledge on right bank, and was installed November 9, 1913. Original gage, located 150 feet downstream, consisted of two vertical sections on left bank; read till November 8, 1913.

Discharge measurements.—Made from car and cable, 90 feet below gage, or by wading.

Channel and control.—Gravel and small boulders; shifts during high water.

Extremes of discharge.—Maximum stage recorded during year, 11.7 feet, at 2.10 p. m., May 11 (discharge, 9,930 second-feet, computed from extension of rating curve and may be subject to error); minimum stage recorded, 2.35 feet, October 1–10 and 14–16 (discharge,1. 8 second-feet).

1911–1915: Maximum stage recorded, 12.0 feet, December 31, 1913 (discharge, 10,400 second-feet, computed from extension of rating curve and may be subject to error); minimum stage recorded, 0.58 foot, September 29–30, October 1–3 and 7–10, 1913 (discharge, 0.9 second-foot).

Diversions.—The diversion dam of the Palermo Land & Water Co.'s canal is located 1 mile above the station. The South Feather Land & Water Co.'s canal diverts from Lost and Pinkard Creeks, above the station. This water is used for irrigation in the vicinity of Wyandotte and Bangor.

Regulation.—None.

Accuracy.—Results fair.

Discharge measurements of South Fork of Feather River at Enterprise, Cal., during the year ending Sept. 30, 1916.

[Made by Charles Leidl.]

Date.	Gage height.		Discharge.
	Left bank.	Right bank.	
	Feet.	*Feet.*	*Sec.-ft.*
Feb. 8	3.70	5.02	916
Apr. 13	4.25	5.55	1,280

Daily discharge, in second-feet, of South Fork of Feather River at Enterprise, Cal., for the year ending Sept. 30, 1915.

Day.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.
1	1.8	34	34	53	2,620	700	1,180	980	835	140	42	2.3
2	1.8	34	24	46	3,190	640	1,140	905	765	140	36	2.3
3	1.8	29	76	46	1,550	580	1,300	765	765	140	30	2.3
4	1.8	29	108	76	1,060	552	1,300	670	700	113	30	2.3
5	1.8	24	108	76	800	525	1,260	670	640	113	30	2.3
6	1.8	24	76	120	640	525	1,140	732	640	113	30	2.3
7	1.8	24	76	96	525	498	1,220	732	610	113	24	2.3
8	1.8	24	68	284	905	498	1,140	905	580	113	24	2.3
9	1.8	24	60	164	1,510	470	1,140	2,310	525	90	18	2.3
10	1.8	24	96	108	1,640	470	1,140	4,810	498	90	18	2.3
11	3.8	20	120	96	905	470	1,140	8,400	470	90	18	2.3
12	3.8	20	120	120	700	470	1,300	6,100	446	90	18	2.3
13	2.5	20	76	148	640	498	1,300	3,070	422	90	18	2.3
14	1.8	24	86	525	525	525	1,180	2,410	398	80	18	2.3
15	1.8	24	86	470	445	580	1,180	1,820	375	71	13	2.3
16	1.8	24	68	396	835	610	1,300	1,640	352	71	13	2.3
17	2.5	20	60	266	2,410	640	1,340	2,110	329	71	8.7	2.3
18	60	20	60	164	1,550	640	1,340	2,210	306	71	8.7	2.3
19	60	20	60	120	1,140	670	1,460	2,110	283	56	8.7	2.3
20	120	20	76	108	1,220	700	1,340	1,730	260	56	8.7	2.3
21	40	16	60	76	980	732	1,220	1,460	237	56	5.6	2.3
22	40	16	60	76	835	765	1,140	1,260	237	56	5.6	2.3
23	24	16	60	76	905	835	1,140	1,220	219	48	5.6	2.3
24	20	16	60	76	980	870	1,020	1,300	202	42	5.6	2.3
25	20	16	46	120	835	870	905	1,060	202	42	5.6	2.3
26	20	16	46	108	800	870	835	980	170	42	5.6	3.3
27	20	20	60	212	732	870	905	980	170	42	3.3	3.3
28	16	164	60	835	800	1,820	1,060	942	170	42	3.3	3.3
29	16	46	46	610	....	1,960	1,300	1,060	140	42	3.3	3.3
30	34	34	46	700	....	1,550	1,340	980	140	42	3.3	3.3
31	40	....	46	800	....	1,220	....	835	....	....	2.3	....

NOTE.—Discharge determined from a rating curve well defined between 800 and 1,400 second-feet and fairly well defined below 4,000 second-feet. No record June 12–20; discharge interpolated.

Monthly discharge of South Fork of Feather River at Enterprise, Cal., for the year ending Sept. 30, 1915.

Month.	Discharge in second-feet.			Run-off (total in acre-feet).	Accuracy.
	Maximum.	Minimum.	Mean.		
October	120	1.8	18.3	1,130	C.
November	164	16	28.1	1,670	C.
December	120	24	68.6	4,220	C.
January	835	46	231	14,200	B.
February	3,190	445	1,130	62,800	A.
March	1,960	470	762	46,900	B.
April	1,460	835	1,190	70,800	A.
May	8,400	670	1,840	113,000	B.
June	835	140	403	24,000	C.
July	140	42	77.6	4,770	C.
August	42	2.3	15.0	922	C.
September	3.3	2.3	2.47	147	C.
The year	8,400	1.8	476	345,000	

PALERMO LAND & WATER CO.'S CANAL AT ENTERPRISE, CAL.

LOCATION.—In the NE. ¼ sec. 1, T. 19 N., R. 6 E., 1,000 feet above Alm's residence at Enterprise, Butte County, and three-fourths mile below intake at diversion dam on South Fork of Feather River.

RECORDS AVAILABLE.—October 8, 1911, to September 30, 1915.

GAGE.—Vertical staff on right wall of concrete approach to sheet-iron flume, read once a day by Gus Alm. Original gage was vertical staff fastened to post on right bank about one-fourth mile below. November 9, 1913, its datum was lowered

1.00 foot. This gage was read up to March 31, 1914, and it was also read from March 15 to April 13, 1915, during rebuilding of flume just above it. From April 1, 1914, to March 14, 1915, readings were taken from a gage about 800 feet above old gage, installed March 22, 1914, in the flume. Present gage was installed April 13, 1915. Readings on it began April 14. The relations between the three gages used have not been determined.

Discharge measurements.—Made from foot plank at gage.

Channel and control.—Composed of concrete. Control is throat of approach to metal flume. Control at original station is a length of the channel which is composed of gravel and sand. The control for the gage which was in the old wooden flume was also a length of channel.

Extremes of discharge.—1911-1915: Maximum discharge, 40 second-feet, July 24, 1914; no flow during parts of each year.

Accuracy.—Results excellent. Rating curves well defined.

Canal furnishes water for irrigation below Oroville.

Discharge measurements of Palermo Land & Water Co.'s canal at Enterprise, Cal., during the year ending Sept. 30, 1915.

[Made by Charles Leidl.]

Date.	Gage height.[a]	Gage height.	Discharge.
	Feet.	*Feet.*	*Sec.-ft.*
Feb. 8	....	[b]0.18	1.6
Apr. 13	1.72	[c]1.60	19
Apr. 13	2.20	[c]2.09	32
13	1.30	[c]1.04	9.1

[a] Old gage; datum established Nov. 9, 1913.
[b] Gage in old wooden flume.
[c] New gage installed Apr. 13, 1915.

Daily discharge, in second-feet, of Palermo Land & Water Co.'s canal at Enterprise, Cal., for the year ending Sept. 30, 1915.

Day.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.
1	25	18.2	18.5	15.0	5.7	22	5.6	21	27	38	38	35
2	25	18.2	18.5	15.2	2.4	22	4.0	21	27	38	38	35
3	29	18.2	19.2	15.2	1.4	22	4.8	21	27	38	38	35
4	28	18.2	11.8	15.5	4.4	22	17.0	20	27	38	38	35
5	27	18.2	11.8	15.5	4.2	22	18.2	20	32	38	38	34
6	27	18.2	11.8	15.8	4.2	22	18.2	20	32	38	38	34
7	26	18.0	11.8	15.5	4.2	22	18.2	20	35	38	38	34
8	27	18.0	11.8	16.5	1.8	22	18.2	20	35	38	38	34
9	30	18.0	11.8	11.6	1.7	22	18.2	17.2	37	38	38	33
10	31	18.0	11.8	13.0	2.0	22	18.2	14.4	36	38	37	33
11	31	18.0	12.1	13.0	2.0	22	18.2	11.4	37	37	38	33
12	30	18.0	12.1	13.0	1.7	.0	.6	10.6	37	38	38	34
13	30	18.2	12.1	13.3	1.7	16.5	5.1	10.0	37	38	37	34
14	29	18.2	12.1	12.1	1.7	20	21	17.6	37	38	37	36
15	28	18.2	14.8	11.6	21	.0	21	17.2	36	38	38	34
16	28	18.2	15.5	11.1	13.3	.0	22	17.4	36	38	38	34
17	30	18.2	15.5	11.1	.0	.0	22	17.6	36	37	38	34
18	19.5	18.2	15.5	23	23	.0	22	3.6	38	37	38	33
19	19.5	18.2	15.5	23	23	2.0	22	6.4	38	37	38	32
20	20	18.2	15.5	23	23	15.8	22	17.4	37	37	38	31
21	19.2	18.2	15.5	23	22	15.8	22	17.2	37	38	38	31
22	19.0	18.2	15.5	18.5	22	15.8	21	17.2	37	38	38	31
23	18.8	18.5	15.5	15.5	22	15.8	21	17.2	37	38	38	31
24	19.0	18.5	15.5	15.8	22	15.8	21	17.0	37	38	38	31
25	19.0	18.5	15.5	16.0	22	15.8	21	17.2	38	38	38	31
26	19.0	18.5	15.5	16.0	22	15.8	21	17.2	38	38	38	31
27	19.0	18.5	15.5	11.6	22	15.8	21	17.2	38	38	38	31
28	19.0	19.5	15.5	12.5	22	13.5	21	17.2	38	36	37	31
29	19.0	18.8	15.5	12.5	....	7.4	21	21	38	38	36	31
30	19.5	18.5	15.5	12.5	....	6.5	21	27	38	38	36	31
31	19.5	....	15.5	6.0	....	5.6	....	27	....	38	35	....

NOTE.—Owing to changes in gage, daily discharge determined from three rating curves as follows: Oct. 1 to Mar. 14, well defined; Mar. 15 to Apr. 13, well defined above 5.0 second-feet; Apr. 14 to Sept. 30, well defined.

Monthly discharge of Palermo Land & Water Co.'s canal at Enterprise, Cal., for the year ending Sept. 30, 1915.

Month.	Discharge in second-feet.			Run-off (total in acre-feet).	Accuracy.
	Maximum.	Minimum.	Mean.		
October	31	18.8	24.2	1,490	A.
November	19.5	18.0	18.3	1,090	A.
December	19.2	11.8	14.5	892	A.
January	23	6.0	14.9	916	A.
February	23	.0	11.4	633	A.
March	22	.0	14.2	873	A.
April	22	.6	17.6	1,050	A.
May	27	3.6	17.3	1,060	A.
June	38	27	35.3	2,100	A.
July	38	37	37.8	2,320	A.
August	38	35	37.6	2,310	A.
September	36	31	32.9	1,960	A.
The year	38	.0	23.1	16,700	

MIDDLE FORK OF YUBA RIVER[1] NEAR NORTH SAN JUAN, CAL.

Location.—In the N. ½ NW. ¼ sec. 23, T. 18 N., R. 8 E., below highway bridge at Freeman's Crossing, in Tahoe National Forest, 1¼ miles northeast of North San Juan, Nevada County. Moonshine Creek enters one-fourth mile below, Oregon Creek three-fourths mile above, and North Fork of Yuba River about 4 miles below the station.

Drainage area.—Not measured.

Records available.—October 27, 1910, to September 30, 1915.

Gage.—Vertical staff wedged between two large boulders on right bank one-fourth mile below bridge; read once a day by Henry Zurhorst.

Discharge measurements.—Made from car and cable 200 feet above gage or by wading.

Channel and control.—Gravel and small boulders; fairly permanent.

Extremes of discharge.—Maximum stage recorded during year, 11.7 feet at 10 a. m. May 12 (discharge, 14,300 second-feet); minimum stage recorded, 4.32 feet October 1, 2 and 16 (discharge, 40 second-feet).

1910–1915: Maximum stage recorded, 11.7 feet at 10 a. m. May 12, 1915 (discharge, 14,300 second-feet); minimum stage recorded, 4.30 feet September 23 to 27, 1914 (discharge, 35 second-feet).

Diversions.—No information.

Regulation.—No information.

Accuracy.—Results good.

Discharge measurements of Middle Fork of Yuba River near North San Juan, Cal., during the year ending Sept. 30, 1915.

[Made by H. J. Tompkins.]

Date.	Gage height.	Discharge.	Date.	Gage height.	Discharge.	Date.	Gage height.	Discharge.
	Feet.	*Sec.-ft.*		*Feet.*	*Sec.-ft.*		*Feet.*	*Sec.-ft.*
Nov. 24	4.39	56	Feb. 3	6.35	1,160	May 17	7.55	2,970
Jan. 28	5.70	674	May 11	11.50	13,700	Aug. 28	4.49	57

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[1] Known locally as Middle Yuba River.

Daily discharge, in second-feet, of Middle Fork of Yuba River near North San Juan, Cal., for the year ending Sept. 30, 1915.

Day.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.
1	40	100	72	100	3,520	715	1,040	990	1,920	355	90	55
2	40	100	72	109	3,520	655	1,040	750	1,840	330	83	55
3	60	91	182	109	1,400	600	1,280	715	1,480	330	78	55
4	60	80	80	160	785	572	1,130	655	1,360	282	78	55
5	60	72	85	145	600	545	1,080	628	1,360	238	78	55
6	55	65	115	210	545	545	1,040	715	1,480	238	78	50
7	55	60	130	175	450	495	1,080	785	1,540	238	78	46
8	55	60	109	228	860	495	1,040	860	1,610	238	74	46
9	72	60	85	182	1,400	495	945	2,500	1,360	198	74	46
10	85	60	139	145	945	495	1,130	6,100	1,240	198	74	46
11	72	60	145	145	655	495	1,230	7,410	1,030	198	74	46
12	65	60	130	175	572	495	1,400	14,300	840	191	68	46
13	60	60	100	245	495	520	1,450	5,110	800	169	68	46
14	55	72	55	520	472	600	1,130	3,520	760	162	68	55
15	48	60	85	370	450	655	1,080	2,760	722	162	62	58
16	40	60	100	288	545	715	1,340	2,560	685	146	62	50
17	60	60	115	253	2,600	750	1,570	2,870	615	136	74	50
18	85	60	100	242	2,150	785	1,700	3,960	650	130	68	46
19	115	60	100	225	1,450	785	1,770	3,080	582	130	62	50
20	175	60	85	225	1,230	785	1,840	2,560	550	124	58	55
21	115	60	60	219	860	785	1,450	2,090	520	116	58	50
22	85	60	60	210	785	860	1,280	1,840	490	108	58	50
23	80	55	60	195	860	945	1,180	1,760	490	108	58	46
24	72	55	72	201	945	1,040	945	1,760	490	108	58	46
25	72	60	72	242	860	945	945	1,480	435	102	58	46
26	65	60	85	260	785	945	785	1,480	380	102	58	50
27	65	60	109	370	715	785	945	1,760	380	97	55	50
28	65	115	100	655	822	2,070	1,040	2,090	380	97	55	50
29	65	85	100	572	....	1,510	1,040	2,090	380	90	62	50
30	91	85	100	600	....	1,130	1,230	1,760	380	90	55	50
31	85	....	91	715	....	1,040	....	1,920	....	90	55	....

NOTE.—Daily discharge determined from three rating curves as follows: Oct. 1 to Jan. 14 and Jan. 15 to May 12, fairly well defined; May 13 to Sept. 30 well defined.

Monthly discharge of Middle Fork of Yuba River near North San Juan, Cal., for the year ending Sept. 30, 1915.

Month.	Discharge in second-feet.			Run-off (total in acre-feet).	Accuracy.
	Maximum.	Minimum.	Mean.		
October	175	40	71.5	4,400	B.
November	115	55	68.5	4,080	B.
December	182	60	96.5	5,930	B.
January	715	100	274	16,800	B.
February	3,520	450	1,120	62,200	B.
March	2,070	495	782	48,100	B.
April	1,840	785	1,210	72,000	B.
May	14,300	628	2,670	164,000	B.
June	1,920	380	892	53,100	A.
July	355	90	171	10,500	A.
August	90	55	67.1	4,130	A.
September	55	46	50.1	2,980	A.
The year	14,300	40	617	448,000	

YUBA RIVER AT SMARTSVILLE, CAL.

Location.—In sec. 22, T. 16 N., R. 6 E., at Narrows, 1 mile north of Smartsville, Yuba County, 1 mile below mouth of Deer Creek, 6½ miles below mouth of South Fork, 7 miles above mouth of Dry Creek, and 18 miles above the junction with Feather River.

Drainage area.—1,220 square miles.

Records available.—June 2, 1903, to September 30, 1915.

Gage.—Staff in three sections, bolted to solid rock on left bank, read to quarter-tenths once a day by Joseph French. On account of the gradual erosion of the channel the gage datum was lowered 10 feet on August 1, 1906. Before the change, first section was vertical and driven into gravel near left bank 50 feet below cable; second section was painted on rock ledge on left bank.

Discharge measurements.—Made from car and cable at gage.

Channel and control.—Gravel and small boulders; shifts during high water. As the result of extensive hydraulic mining in the early days, the channel has been filled with an enormous quantity of tailings. At the station the depth of mining débris is estimated to be more than 80 feet.

Extremes of discharge.—Maximum stage recorded during year, 20.0 feet at 9.15 a. m. May 12 (discharge, 46,500 second-feet); minimum discharge, 285 second-feet, October 1.

1903–1915: Maximum stage recorded, 28.3 feet January 15, 1909 (discharge, 111,000 second-feet); minimum stage recorded, 3.23 feet October 5, 1913 (discharge, 216 second-feet).

Diversions.—Water is diverted for power and irrigation above the station. Also see next paragraph.

Regulation.—Several small glacial lakes near the headwaters of the South Fork of Yuba are utilized as storage reservoirs. A part of this water is diverted into the Bear and American River drainage basins.

Accuracy.—Conditions for obtaining accurate discharge data at high stages are poor, owing to the shifting of the channel and the torrential nature of the stream. Results, except at high stages, are good.

Discharge measurements of Yuba River at Smartsville, Cal., during the year ending Sept. 30, 1915.

Date.	Made by—	Gage height.	Discharge.	Date.	Made by—	Gage height.	Discharge.
		Feet.	*Sec.-ft.*			*Feet.*	*Sec.-ft.*
Nov. 21	H. J. Tompkins	4.00	373	Apr 12	Charles Leidl	8.41	7,300
Feb. 12	Charles Leidl	7.20	4,110	May 19	H. J. Tompkins	11.52	13,500

Daily discharge, in second-feet, of Yuba River at Smartsville, Cal., for the year ending Sept. 30, 1915.

Day.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.
1	285	402	458	515	24,200	5,250	6,250	6,450	9,000	1,520	472	348
2	330	698	485	545	24,800	4,720	6,050	5,450	8,800	1,470	472	348
3	330	485	1,010	545	12,800	4,380	7,350	5,080	7,250	1,350	456	348
4	352	458	865	935	7,010	4,050	7,580	4,550	6,700	1,230	440	348
5	330	430	935	730	4,690	3,750	7,120	4,720	6,500	1,160	440	348
6	330	402	762	1,120	3,430	3,600	6,050	4,900	6,700	1,060	440	348
7	330	375	795	935	3,110	3,300	6,450	5,650	9,000	1,020	440	333
8	308	330	665	2,670	6,570	3,450	6,050	6,250	7,250	962	440	333
9	352	375	635	1,240	9,500	3,600	5,650	15,600	6,700	904	424	333
10	430	402	935	900	8,160	3,450	6,450	27,200	5,700	850	424	318
11	458	375	972	830	5,290	3,300	6,680	41,900	5,150	825	408	318
12	375	352	795	1,080	3,950	3,450	7,350	46,500	4,500	800	408	318
13	352	330	698	1,580	3,270	3,300	7,580	25,600	3,880	776	408	318
14	352	308	575	4,630	2,820	3,750	6,250	18,600	3,540	752	408	318
15	330	330	545	1,860	2,680	4,200	6,050	16,100	4,240	729	408	318
16	308	330	575	1,240	3,270	4,380	7,120	12,800	3,710	706	408	318
17	375	308	698	1,080	14,700	4,720	8,020	16,100	3,380	662	408	318
18	545	330	665	935	12,300	5,080	7,800	16,700	3,230	620	393	318
19	458	308	698	865	8,020	4,900	11,200	13,700	2,960	600	393	318
20	1,010	285	830	830	8,250	4,720	10,600	11,400	2,820	580	378	304
21	575	375	635	795	6,450	5,080	9,150	9,160	2,700	580	378	304
22	458	375	575	762	6,250	5,250	7,580	7,850	2,580	542	378	304
23	430	375	545	730	6,450	5,650	7,350	7,610	2,580	542	378	290
24	402	402	545	698	6,680	6,050	6,450	7,150	2,350	542	378	290
25	375	375	515	935	6,250	5,450	6,050	6,050	2,130	542	378	290
26	375	352	545	1,010	5,650	5,650	5,450	5,840	1,930	524	378	290
27	375	375	575	1,320	5,080	6,680	6,450	7,150	1,790	506	378	290
28	402	730	545	4,440	6,050	12,300	8,020	9,970	1,740	506	363	290
29	430	545	515	3,230	......	9,850	9,850	10,000	1,650	506	363	304
30	485	515	545	3,080	......	6,900	8,480	9,500	1,560	489	348	304
31	515	......	515	7,900	......	6,450	......	8,800	......	472	348	......

NOTE.—Discharge computed from five rating curves as follows: Oct. 1 to Feb. 2, fairly well defined; Feb. 3-17, well defined; Feb. 18 to May 12, fairly well defined; May 13-28, poorly defined; and May 29 to Sept. 30, computed by indirect method for shifting control.

Monthly discharge of Yuba River at Smartsville, Cal., for the year ending Sept. 30, 1915.

Month.	Discharge in second-feet.			Run-off (total in acre-feet).	Accuracy.
	Maximum.	Minimum.	Mean.		
October	1,010	285	412	25,300	B.
November	730	285	401	23,900	B.
December	1,010	458	666	41,000	B.
January	7,900	515	1,610	99,000	B.
February	24,800	2,680	7,770	432,000	C.
March	12,300	3,300	5,050	311,000	B.
April	11,200	5,450	7,280	433,000	B.
May	46,500	4,550	12,700	781,000	C.
June	9,000	1,560	4,400	262,000	
July	1,520	472	785	48,300	
August	472	348	404	24,800	
September	348	290	318	18,900	
The year	46,500	285	3,450	2,500,000	.....

OREGON CREEK NEAR NORTH SAN JUAN, CAL.

LOCATION.—In the N. ½ SE. ¼ sec. 28, T. 18 N., R. 8 E., below highway bridge, in Tahoe National Forest, 500 feet above junction with Middle Fork of Yuba River, half a mile above Freemans Crossing, Yuba County, and 2 miles northeast of North San Juan, Nevada County.

DRAINAGE.—Not measured.

Records available.—October 28, 1910, to September 30, 1915.

Gage.—Vertical staff fastened to an alder tree on right bank 150 feet below bridge, read once a day by H. Zurhorst.

Discharge measurements.—Made from car and cable, 30 feet below gage or by wading.

Channel and control.—Small boulders and gravel; shifts during high water.

Extremes of discharge.—Maximum stage recorded during year, 6.65 feet at 10 a. m. May 12 (discharge, 1,620 second-feet); minimum stage recorded, 3.70 feet October 1, 2, and 29 (discharge, 4 second-feet).

1910–1915: Maximum stage recorded, 8.5 feet at 5 p. m. December 31, 1913 (discharge, 4,080 second-feet, determined from extension of rating curve and may be subject to error); minimum stage recorded. 3.70 feet September 13 to 20, 1913 (discharge, 2 second-feet).

Diversion.—None.

Regulation.—None.

Accuracy.—Results good.

Discharge measurements of Oregon Creek near North San Juan, Cal., during the year ending Sept. 30, 1915.

[Made by H. J. Tompkins.]

Date.	Gage height.	Discharge.	Date.	Gage height.	Discharge.	Date.	Gage height.	Discharge.
	Feet.	*Sec.-ft.*		*Feet.*	*Sec.-ft.*		*Feet.*	*Sec.-ft.*
Nov. 24	3.80	6.8	Feb. 3	5.34	396	May 18	5.75	636
Jan. 28	4.94	189	May 11	6.60	1,560	Aug. 28	3.81	6.6

Daily discharge, in second-feet, of Oregon Creek near North San Juan, Cal., for the year ending Sept. 30, 1915.

Day.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.
1	4	11	7	10	1,140	246	278	145	115	23	11	8
2	4	11	7	11	970	210	255	160	108	23	10	7
3	6.5	10	23	11	394	232	278	120	97	21	10	6.5
4	5.5	8	17	16	246	175	255	108	93	21	10	6.5
5	5.5	7	17	14	175	169	255	108	87	21	10	7
6	5.5	8	14	30	145	160	246	108	81	19	10	7
7	4.5	7	14	23	125	151	255	102	77	19	7	7
8	4.5	7	11	35	255	145	232	108	69	19	7	7
9	8	7	10	21	350	145	232	300	64	19	7	7
10	9	7	14	17	255	145	255	405	61	21	7	7
11	7	7	17	14	175	145	232	1,440	61	17	7	7
12	7	7	14	17	151	145	255	1,620	58	17	7	7
13	5.5	7	11	41	132	160	232	780	54	17	7	7
14	5.5	9	8	120	120	175	246	535	54	17	7	7
15	5.5	7	9	47	115	203	255	378	50	17	7	7
16	4.5	7	10	30	132	210	232	350	47	16	7	7
17	5.5	7	11	23	780	210	232	350	45	16	7	7
18	6.5	7	11	19	690	219	210	650	41	14	7	7
19	9	7	11	17	465	219	210	535	35	14	7	7
20	14	7	11	17	405	210	210	405	37	14	7	7
21	11	7	10	16	300	210	192	340	37	14	7	7
22	9	7	10	16	264	210	175	278	35	12	7	7
23	7	7	10	12	300	219	175	246	35	12	7	8
24	6.5	7	10	14	340	219	151	255	33	12	7	8
25	6.5	7	10	35	300	210	145	210	33	11	7	8
26	5.5	7	11	33	255	210	125	175	30	11	7	10
27	4.5	7	11	61	232	192	132	169	27	11	7	8
28	4.5	14	11	192	255	465	145	151	25	11	7	7
29	4	11	10	145	......	394	160	145	25	11	7	7
30	10	9	10	151	......	300	175	132	25	11	7	7
31	8	......	10	210	......	291	......	120	......	11	7	......

Note.—Discharge determined from a rating curve fairly well defined below 2,000 second-feet.

Monthly discharge of Oregon Creek near North San Juan, Cal., for the year ending Sept. 30, 1915.

Month.	Discharge in second-feet.			Run-off (total in acre-feet).	Accuracy.
	Maximum.	Minimum.	Mean.		
October	14	4	6.56	403	C.
November	14	7	7.93	472	C.
December	23	7	11.6	713	C.
January	210	10	45.7	2,810	B.
February	1,140	115	338	18,800	B.
March	465	145	213	13,100	B.
April	278	125	214	12,700	B.
May	1,620	102	353	21,700	B.
June	115	25	54.6	3,250	B.
July	23	11	15.9	978	B.
August	11	7	7.61	468	C.
September	10	6.5	7.23	430	C.
The year	1,620	4	105	75,800	

NORTH FORK OF YUBA RIVER[1] AT GOODYEAR BAR, CAL.

Location.—In the E. ½ SW. ¼ sec. 5, T. 19 N., R. 10 E., in Tahoe National Forest, at highway bridge at Goodyear Bar, Sierra County. Rock Creek and Goodyear Creek enter one-eighth and one-fourth mile, respectively, below the station and North Fork of North Fork of Yuba River enters at Downieville, 4 miles above.

Drainage area.—214 square miles.

Records available.—October 31, 1910, to September 30, 1915.

Gage.—Vertical staff in two sections on left bank; read once a day by G. E. King. Low-water section is fastened to old piling under bridge, while remainder of gage is bolted to left abutment of bridge.

Discharge measurements.—Made from downstream side of bridge or by wading.

Channel and control.—Solid rock, small boulders, and gravel; appears permanent.

Extremes of discharge.—Maximum stage recorded during year, 11.5 feet at 5.40 p. m. May 11 (discharge, 12,600 second-feet); minimum stage recorded, 3.3 feet September 21 to 30 (discharge, 133 second-feet).

1910–1915: Maximum stage recorded, 11.5 feet at 5.40 p. m. May 11, 1915 (discharge, 12,600 second-feet) ; minimum stage recorded, 3.3 feet October 1 to 4, 13 to 21, 1912, and September 16 to October 31, 1913 (discharge, 116 second-feet).

Diversions.—No information.

Regulation.—No information.

Accuracy.—Results good.

Cooperation.—Gage-height record furnished by United States Forest Service.

Discharge measurements of North Fork of Yuba River at Goodyear Bar, Cal., during the year ending Sept. 30, 1915.

[Made by H. J. Tompkins.]

Date.	Gage height.	Discharge.	Date.	Gage height.	Discharge.	Date.	Gage height.	Discharge.
	Feet.	*Sec.-ft.*		*Feet.*	*Sec.-ft.*		*Feet.*	*Sec.-ft.*
Oct. 29	3.50	185	Feb. 1	5.85	1,780	May 16	6.55	2,860
Jan. 31	4.10	448	May 10	9.20	7,970	Aug. 30	3.40	163

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[1] Known locally as North Yuba River.

Daily discharge, in second-feet, of North Fork of Yuba River at Goodyear Bar, Cal., for the year ending Sept. 30, 1915.

Day.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.
1	180	200	180	163	2,170	550	945	1,300	3,330	715	235	163
2	180	200	180	163	1,710	550	1,120	1,120	2,790	a 680	235	163
3	180	180	220	180	752	460	1,500	1,030	2,410	645	235	163
4	180	180	200	180	580	460	1,350	a1,030	2,530	645	235	163
5	180	180	200	180	460	460	1,120	a1,030	2,530	580	235	163
6	180	180	200	180	432	432	1,030	1,030	2,790	580	235	148
7	180	180	200	180	405	432	1,120	1,120	3,300	580	235	148
8	200	180	200	220	988	a 432	1,030	1,210	2,600	520	235	148
9	220	180	180	180	715	432	1,030	4,260	2,530	520	216	a 148
10	200	a 180	200	180	580	432	1,120	6,710	2,290	520	216	148
11	200	180	180	180	490	432	1,500	11,000	1,930	465	216	148
12	a 193	180	180	180	405	432	1,600	9,290	a1,760	465	216	148
13	a 186	180	163	240	405	460	1,500	4,260	1,600	415	197	148
14	180	180	163	355	380	520	1,300	3,480	1,500	415	197	148
15	163	163	163	240	380	645	1,400	3,330	1,500	415	197	148
16	163	163	163	240	715	680	a1,540	2,790	1,400	415	197	148
17	220	163	163	180	1,300	752	a1,680	3,050	1,400	365	197.	148
18	220	163	163	180	945	752	1,820	2,920	1,400	365	197	148
19	355	163	163	180	715	752	2,290	2,290	1,300	320	180	148
20	240	163	163	180	715	752	2,050	a2,110	1,300	320	180	148
21	220	163	163	163	580	790	1,820	1,930	1,120	320	180	133
22	200	163	163	a 180	580	865	1,600	2,050	1,120	320	a 176	133
23	180	163	163	a 180	580	1,030	1,500	1,820	1,030	320	a 172	133
24	180	163	163	180	612	1,030	1,300	1,820	945	275	a 169	133
25	180	163	163	200	550	1,030	1,210	1,550	865	275	a 166	133
26	180	163	163	200	520	945	1,210	1,350	a 828	275	163	133
27	a 180	163	163	305	520	945	1,400	1,820	790	275	163	a 133
28	180	180	163	520	580	1,710	1,930	2,790	790	275	163	a 133
29	180	180	163	460	......	1,210	2,170	3,050	790	275	163	133
30	180	180	163	405	......	945	1,600	2,920	790	275	163	133
31	180	......	163	460	......	945	......	a3,120	......	275	163	......

a Interpolated.

NOTE.—Discharge determined from two well-defined rating curves applicable Oct. 1 to May 11 and May 12 to Sept. 30. Discharge May 25–27 and June 7 and 8 estimated by comparison with records of flow of Yuba River at Smartsville and Middle Fork of Yuba River near North San Juan.

Monthly discharge of North Fork of Yuba River at Goodyear Bar, Cal., for the year ending Sept. 30, 1915.

[Drainage area, 214 square miles.]

Month.	Discharge in second-feet.				Run-off.		Accuracy.
	Maximum.	Minimum.	Mean.	Per square mile.	Depth in inches on drainage area.	Total in acre-feet.	
October	355	163	195	0.911	1.05	12,000	B.
November	200	163	174	.813	.91	10,400	B.
December	220	163	175	.818	.94	10,800	B.
January	520	163	233	1.09	1.26	14,300	B.
February	2,170	380	706	3.30	3.44	39,200	A.
March	1,710	432	718	3.36	3.87	44,100	A.
April	2,290	945	1,460	6.82	7.61	86,900	B.
May	11,000	1,030	2,860	13.4	15.45	176,000	B.
June	3,330	790	1,710	7.99	8.91	102,000	B.
July	715	275	423	1.98	2.28	26,000	A.
August	235	163	198	.925	1.07	12,200	B.
September	163	133	146	.682	.76	8,690	B.
The year	11,000	133	748	3.50	47.55	543,000	

NORTH FORK OF NORTH FORK OF YUBA RIVER[1] AT DOWNIEVILLE, CAL.

Location.—In the NE. ¼ NW. ¼ sec. 35, T. 20 N., R. 10 E., at upper highway bridge in Downieville, Sierra County, 500 feet above dam, and one-fourth mile above junction with North Fork of Yuba River. East Fork of North Fork enters onee eighth mile above, and Middle Fork of North Fork 1¼ miles above the station.

Drainage area.—71.2 square miles.

Records available.—November 1, 1910, to September 30, 1915.

Gage.—Vertical staff fastened to right abutment of bridge; read twice a day by J. T. Mason.

Discharge measurements.—Usually made from bridge at gage or by wading.

Channel and control.—Gravel and small boulders. No change in control from 1910 to May 11, 1915.

Extremes of discharge.—Maximum stage recorded during year, 8.0 feet at 5 p. m. May 11; (discharge, 6,760 second-feet, determined from extension of rating curv-and may be subject to error); minimum stage recorded, 2.60 feet at 6 p. m. October 1 to 18 and November 2 (discharge, 42 second-feet).

1911–1915: Maximum stage recorded, 8.0 feet at 5 p. m. May 11, 1915 (discharge determined from extension of rating curve, 6,760 second-feet); minimum stage recorded, 2.55 feet October 14–18, 1912 (discharge, 36 second-feet).

Diversions.—The intake of the municipal water system of Downieville is above the station.

Regulation.—None.

Accuracy.—Results good. Since flood of May 11, 1915, control is partially drowned out by use of flash boards on dam, which requires use of a special rating curve. Stage-discharge relation is considerably affected at low water by operation of power plant at dam. Observer has been instructed to read gage when plant is not running. It is usually shut down between about 7.30 a. m. and about 4.30 p. m.

Cooperation.—Gage-height record furnished by John T. Mason.

Discharge measurements of North Fork of North Fork of Yuba River at Downieville, Cal., during the year ending Sept. 30, 1915.

[Made by H. J. Tompkins.]

Date.	Gage height.	Discharge.	Date.	Gage height.	Discharge.	Date.	Gage height.	Discharge.
	Feet.	*Sec.-ft.*		*Feet.*	*Sec.-ft.*		*Feet.*	*Sec.-ft.*
Oct. 29	[a]2.75	60	May 9	5.10	1,790	May 15	[b]4.28	1,180
Jan. 20	3.0	138	14	[b]4.45	1,310	Aug. 30	[c]2.70	68

[a] Beginning of measurement, power plant and mill not running, stage, 2.75 feet; end of measurement both were running, stage, 2.68 feet.

[b] Power plant running, using 28 second-feet; no flashboards on dam.

[c] Power plant not running; 18-inch flashboards on dam; leakage estimated at 4 second-feet.

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[1] Known locally as North Fork of North Yuba River.

Daily discharge, in second-feet, of North Fork of North Fork of Yuba River at Downieville, Cal., for the year ending Sept. 30, 1915.

Day.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.
1	50	57	68	57	815	205	403	467	1,070	235	108	68
2	50	50	68	57	676	197	467	367	880	203	108	68
3	50	57	57	57	275	185	655	328	762	195	100	68
4	50	57	57	57	214	165	606	311	800	188	90	68
5	50	57	57	57	148	165	515	385	840	160	90	68
6	50	57	57	57	125	165	415	385	925	154	90	68
7	50	57	57	57	125	165	448	385	970	146	90	68
8	50	57	57	57	250	165	480	415	880	152	90	68
9	50	57	57	57	275	165	448	1,680	880	145	90	68
10	50	57	57	57	214	165	515	3,210	650	145	90	68
11	50	57	57	57	165	165	634	5,840	615	145	90	68
12	50	57	57	57	116	165	634	4,160	545	145	90	68
13	50	57	57	57	116	165	620	1,990	545	145	90	68
14	50	57	57	148	125	205	620	1,380	566	145	90	68
15	50	57	57	78	130	250	550	1,270	478	145	90	68
16	50	57	57	68	205	260	770	1,270	445	145	90	68
17	50	57	57	57	550	290	860	1,270	445	145	90	68
18	50	57	57	61	385	344	1,000	1,270	445	145	90	68
19	125	57	57	68	275	311	905	970	385	145	90	68
20	90	57	57	68	250	344	770	864	409	139	90	68
21	57	57	57	68	214	355	655	740	330	133	90	68
22	57	57	57	68	205	385	564	785	341	121	90	68
23	61	57	57	68	205	367	515	650	374	115	90	68
24	61	57	57	68	205	428	494	650	374	115	90	68
25	61	57	57	68	205	428	403	650	305	115	79	68
26	57	57	57	68	205	428	385	740	280	115	79	68
27	57	57	57	108	205	385	550	785	280	115	79	68
28	57	68	57	148	205	585	690	1,070	305	115	72	68
29	74	68	57	165	....	515	770	880	271	115	68	68
30	68	68	57	148	....	403	585	970	235	115	68	68
31	68	....	57	165	....	355	....	970	....	110	68	....

NOTE.—Discharge determined from three rating curves as follows: Oct. 1 to May 11, well defined between 100 and 2,000 second-feet; May 12 to July 8, well defined below 2,000 second-feet (no flashboards on the dam below); July 8 to Sept. 30, fairly well defined (18-inch flashboards on the dam below).

Monthly discharge of North Fork of North Fork of Yuba River at Downieville, Cal., for the year ending Sept. 30, 1915.

[Drainage area, 71.2 square miles.]

Month.	Discharge in second-feet.				Run-off.		Accuracy.
	Maximum.	Minimum.	Mean.	Per square mile.	Depth in inches on drainage area.	Total in acre-feet.	
October	125	50	57.8	0.812	0.94	3,550	B.
November	68	50	57.9	.813	.91	3,450	B.
December	68	57	57.7	.810	.93	3,550	B.
January	165	57	78.4	1.10	1.27	4,820	B.
February	815	116	253	3.55	3.70	14,100	A.
March	585	165	286	4.02	4.64	17,600	A.
April	1,000	385	598	8.40	9.37	35,600	A.
May	5,840	311	1,200	16.9	19.48	73,800	B.
June	1,070	235	554	7.78	8.68	33,000	A.
July	235	110	144	2.02	2.33	8,850	B.
August	108	68	87.7	1.23	1.42	5,390	B.
September	68	68	68	.955	1.07	4,050	B.
The year	5,840	50	287	4.03	54.74	208,000	

ROCK CREEK AT GOODYEAR BAR, CAL.

Location.—In the W. ½ SW. ¼ sec. 5, T. 19 N., R. 10 E., at footbridge at Goodyear Bar, Sierra County, in Tahoe National Forest. Woodruff Creek enters 350 feet above and Rock Creek joins the North Fork of Yuba River 600 feet below the station.

Drainage area.—10.8 square miles.

Records available.—October 30, 1910, to September 30, 1915.

Gage.—Vertical staff fastened to an alder tree on right bank 40 feet below bridge, read once a day by G. E. King.

Discharge measurements.—Made from bridge or by wading.

Channel and control.—Rough; composed of boulders and gravel; somewhat shifting during high water.

Extremes of discharge.—Maximum stage recorded during year, 5.0 feet at 6 p. m. May 11 (discharge, 573 second-feet); minimum stage recorded, 0.85 foot November 25–27 (discharge, 0.8 second-foot).

1910–1915: Maximum stage recorded, 7.0 feet at 3.30 p. m. December 31, 1913 (roughly approximated discharge determined from extension of rating curve, 820 second-feet); minimum stage recorded, 2.0 feet during parts of August and September, 1911 and 1913 (discharge, 0.5 second-foot).

Diversions.—Three small ditches (total capacity about 10 second-feet), head above the station.

Regulation.—None.

Accuracy.—Results fair. Rating curve, which has been applicable since January 1, 1914, is fairly well defined.

Cooperation.—Gage-height record furnished by United States Forest Service.

Discharge measurements of Rock Creek at Goodyear Bar, Cal., during the year ending Sept. 30, 1915.

[Made by H. J. Tompkins.]

Date.	Gage height.	Discharge.	Date.	Gage height.	Discharge.	Date.	Gage height.	Discharge.
	Feet.	*Sec.-ft.*		*Feet.*	*Sec.-ft.*		*Feet.*	*Sec.-ft.*
Oct. 29	1.05	1.8	Feb. 1	4.00	442	May 16	2.85	120
Jan. 31	2.15	51	May 10	4.20	384	Aug. 30	.98	1.2

Daily discharge, in second-feet, of Rock Creek at Goodyear Bar, Cal., for the year ending Sept. 30, 1915.

Day.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.
1	1.1	1.5	1.2	1.2	362	50	83	73	46	6.0	1.0	1.0
2	1.1	1.5	2.5	1.2	235	42	94	63	39	a 6.0	1.0	1.0
3	1.1	1.5	2.0	6.0	88	39	106	54	39	6.0	1.0	1.0
4	1.1	1.5	1.5	4.0	54	39	94	a 51	33	5.0	1.0	1.0
5	1.1	1.5	2.0	3.2	46	36	83	a 48	30	4.0	1.0	1.0
6	1.1	1.5	2.0	2.5	36	33	78	46	27	4.0	1.0	1.0
7	1.1	1.5	2.0	2.5	33	33	88	46	a 27	3.2	1.0	1.0
8	1.4	1.5	1.5	7.5	126	a 33	83	46	a 27	3.2	1.0	1.0
9	1.4	1.5	1.5	4.0	83	33	83	197	27	3.2	1.0	a 1.0
10	1.4	a 1.4	1.5	3.2	54	33	83	408	27	2.5	1.0	1.0
11	1.4	1.2	1.5	3.2	42	33	94	525	22	2.5	1.0	1.0
12	a 1.3	1.2	1.5	4.0	36	33	94	454	a 20	2.5	1.0	1.0
13	a 1.2	1.2	1.5	17	30	39	83	235	17	2.5	1.0	1.0
14	1.1	1.2	1.2	27	30	46	83	163	17	2.5	1.0	1.0
15	1.1	1.2	1.0	13	27	54	83	147	17	2.0	1.0	1.0
16	1.1	1.2	1.0	9.0	94	54	a 90	133	17	2.0	1.0	1.0
17	1.1	1.2	1.0	6.0	215	58	a 98	180	13	2.0	1.0	1.0
18	1.1	1.2	1.0	6.0	119	58	106	197	17	2.0	1.0	1.0
19	9.8	1.2	1.0	5.0	94	58	119	163	13	1.5	1.0	1.0
20	2.8	1.2	1.0	5.0	78	58	106	a 141	13	1.5	1.0	1.0
21	2.2	1.2	1.0	4.0	58	58	94	119	9.0	1.0	1.0	1.0
22	1.7	1.2	1.0	a 4.0	58	63	83	106	9.0	1.0	a 1.0	1.0
23	1.7	1.0	1.0	a 4.0	63	73	73	94	9.0	1.0	a 1.0	1.0
24	1.7	1.0	1.0	4.0	68	73	73	94	9.0	1.5	a 1.0	1.0
25	1.7	.8	1.0	7.5	63	73	63	a 88	9.0	1.5	a 1.0	1.0
26	1.7	.8	1.2	6.0	54	68	63	a 83	a 7.5	1.5	1.0	1.0
27	a 1.7	.8	1.5	39	50	73	73	a 78	6.0	1.5	1.0	a 1.0
28	1.7	1.0	1.5	46	54	133	83	73	4.0	1.0	1.0	a 1.0
29	1.5	1.5	1.2	39	......	106	119	73	4.0	1.0	1.0	1.0
30	1.5	1.5	1.2	46	......	83	83	63	4.0	1.0	1.0	1.0
31	1.5	......	1.2	54	......	83	......	a 54	......	1.0	1.0	......

a Interpolated.

NOTE.—Discharge determined from a fairly well defined rating curve.

Monthly discharge of Rock Creek at Goodyear Bar, Cal., for the year ending Sept. 30, 1915.

Month.	Discharge in second-feet.			Run-off (total in acre-feet).	Accuracy.
	Maximum.	Minimum.	Mean.		
October	9.8	1.1	1.69	104	C.
November	1.5	.8	1.26	75	D.
December	2.5	1.0	1.36	84	C.
January	54	1.2	12.4	762	B.
February	362	27	83.9	4,660	B.
March	133	33	56.4	3,470	B.
April	119	63	87.9	5,230	B.
May	525	46	139	8,550	C.
June	46	4.0	18.6	1,110	B.
July	6.0	1.0	2.49	153	C.
August	1.0	1.0	1.0	61	D.
September	1.0	1.0	1.0	60	D.
The year	525	.8	33.5	24,300	

GOODYEAR CREEK AT GOODYEAR BAR, CAL.

Location.—In the W. ½ SW. ¼ sec. 5, T. 19 N., R. 10 E., at trail bridge in Tahoe National Forest, 300 feet above junction with North Fork of Yuba River, and half a mile north of Goodyear Bar, Sierra County.

Drainage area.—12.2 square miles.

Records available.—October 30, 1910, to September 30, 1915.

Gage.—Vertical staff fastened to an alder tree on left bank 200 feet above bridge; read once a day by G. E. King.

Discharge measurements.—Made from bridge or by wading.

Channel and control.—Solid rock and gravel; fairly permanent.

Extremes of discharge.—Maximum stage recorded during year, 5.2 feet at 3 p. m., May 11 (discharge, computed from extension of rating curve, 695 second-feet); minimum stage recorded, 1.25 feet from October 1 to 8 (discharge, 2 second-feet).

1910–1915: Maximum stage recorded, 7.0 feet at 3 p. m. December 31, 1913 (discharge, 1,460 second-feet, computed from extension of rating curve and may be subject to error); minimum stage recorded, 1.25 feet from August 14 to October 8, 1914 (discharge, 2 second-feet).

Diversions.—Three small irrigation ditches (total capacity about 7½ second-feet) head above the station.

Regulation.—None.

Accuracy.—Results good.

Cooperation.—Gage-height record furnished by United States Forest Service.

Discharge measurements of Goodyear Creek at Goodyear Bar, Cal., during the year ending Sept. 30, 1915.

[Made by H. J. Tompkins.]

Date.	Gage height.	Discharge.	Date.	Gage height.	Discharge.
	Feet.	*Sec.-ft.*		*Feet.*	*Sec.-ft.*
Jan. 31	2.21	56	Aug. 30	1.26	4.8
May 16	2.95	151			

Daily discharge, in second-feet, of Goodyear Creek at Goodyear Bar, Cal., for the yearg ending Sept. 30, 1915.

Day.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.
1	2.0	2.5	3.2	3.2	270	65	112	87	72	17	8.5	5.6
2	2.0	2.5	4.0	3.2	199	50	125	76	72	[a] 16	8.5	4.6
3	2.0	2.5	7.0	7.0	82	50	153	65	67	14	8.5	4.6
4	2.0	2.5	4.0	5.5	65	45	125	[a] 69	62	14	7.0	4.6
5	2.0	2.5	4.0	4.0	45	45	118	[a] 72	52	14	7.0	4.6
6	2.0	2.5	4.0	4.0	40	45	112	76	52	14	7.0	4.6
7	2.0	2.5	4.0	4.0	36	[a] 40	125	76	[a] 46	12	8.5	3.7
8	2.0	2.5	4.0	11	146	40	112	76	[a] 41	12	7.0	3.7
9	2.5	2.5	4.0	7.0	87	40	112	338	35	12	7.0	[a] 3.7
10	2.5	[a] 2.5	4.0	5.5	60	40	112	505	35	12	7.0	3.7
11	2.5	2.5	4.0	4.0	50	40	153	695	35	12	7.0	3.7
12	[a] 2.5	2.5	4.0	5.5	36	40	153	364	[a] 39	12	7.0	3.7
13	[a] 2.5	2.5	4.0	15	32	45	139	238	43	12	5.6	3.7
14	2.5	2.5	3.2	32	32	65	139	187	35	12	5.6	3.7
15	2.5	2.5	3.2	13	28	82	139	172	28	10	5.6	3.7
16	2.5	2.5	3.2	9.0	93	82	[a] 149	151	28	10	5.6	3.7
17	2.5	2.5	3.2	7.0	199	99	[a] 158	203	28	10	5.6	3.7
18	2.5	2.5	3.2	7.0	139	99	168	238	28	10	5.6	3.7
19	21	2.5	3.2	5.5	99	99	183	187	28	10	5.6	3.7
20	4.0	2.5	3.2	5.5	98	99	153	[a] 159	22	8.5	5.6	3.7
21	3.2	2.5	3.2	5.5	76	99	139	131	22	8.5	5.6	3.7
22	3.2	2.5	3.2	[a] 5.5	70	112	125	131	22	8.5	[a] 5.6	4.6
23	3.2	2.5	3.2	[a] 5.5	76	118	112	118	22	8.5	[a] 5.6	4.6
24	3.2	2.5	3.2	5.5	76	118	112	118	22	7.0	[a] 5.6	3.7
25	2.5	2.5	3.2	7.0	70	118	87	[a] 109	22	7.0	[a] 5.6	3.7
26	2.5	2.5	3.2	5.5	65	112	87	[a] 100	[a] 20	7.0	5.6	3.7
27	[a] 2.5	2.5	3.2	28	60	112	112	[a] 92	19	7.0	5.6	3.7
28	2.5	4.0	3.2	54	65	183	125	83	19	7.0	5.6	[a] 3.7
29	2.5	4.0	3.2	50	....	112	153	83	17	7.0	5.6	[a] 3.7
30	2.5	4.0	3.2	45	....	112	112	83	14	8.5	5.6	3.7
31	2.5	....	3.2	54	....	112	....	[a] 78	....	7.0	5.6	....

[a] Interpolated.

Note.—Discharge determined from two rating curves as follows: Oct. 1 to May 11, fairly well defined below 300 second-feet; May 12 to Sept. 30, well defined below 200 second-feet.

Monthly discharge of Goodyear Creek at Goodyear Bar, Cal., for the year ending Sept. 30, 1915.

Month.	Discharge in second-feet.			Run-off (total in acre-feet).	Accuracy.
	Maximum.	Minimum.	Mean.		
October	21	2.0	3.11	191	D.
November	4.0	2.5	2.65	158	D.
December	7.0	3.2	3.61	222	C.
January	54	3.2	13.7	842	C.
February	270	28	85.3	4,740	B.
March	183	40	81.2	4,990	B.
April	183	87	130	7,740	B.
May	695	65	166	10,200	C.
June	72	14	34.9	2,080	B.
July	17	7.0	10.5	646	B.
August	8.5	5.6	6.34	390	B.
September	5.6	3.7	3.97	236	B.
The year	695	2.0	44.9	32,400	

BEAR RIVER NEAR COLFAX, CAL.

Location.—In sec. 22, T. 15 N., R. 9 E., at Pacific Gas & Electric Co.'s diversion dam, about half a mile below mouth of Greenhorn River, and 3 miles north of Colfax, Placer County.

Drainage area.—Not measured.

Records available.—November 1, 1911, to September 30, 1915. Records show flow over dam only.

Gage.—Staff in three sections on left bank, read twice a day by Hund and Dixon. Section No. 1, vertical, fastened to post in forebay of canal, in line with crest of dam; No. 2, inclined, fastened to tree 50 feet above dam; No. 3, vertical, fastened to stump 4 feet below No. 2. Originally, No. 1 was fastened to an old wall close to No. 2. It was destroyed January 18, 1913. Present section was installed Mar. 3, 1913, upon same post as Pacific Gas & Electric Co.'s gage.[1] May 1 to December 21, 1913, an auxiliary low-water section was read which was on right bank 25 feet above dam. Original datum has been maintained.

Discharge measurements.—Made from car and cable 500 feet above dam or by wading.

Channel and control.—Channel composed of shifting gravel-tailings from placer mining. Dam forms part of control but discharge is affected by flow in canal.

Extremes of stage.—Maximum stage recorded during year, 8.2 feet at 3.30 p. m. May 11; minimum stage recorded gives no indication of discharge owing to conditions at the dam.

1911–1915: Maximum stage recorded, 8.2 feet at 3.30 p. m. May 11, 1915; minimum discharge recorded, 5 second-feet November 5, 7 and 9, 1912.

Diversions.—Stored water from South Fork of Yuba River is diverted into this drainage above the station.

Regulation.—A small amount of storage has been developed above the station.

Accuracy.—A sufficient number of discharge measurements has not been obtained to define the changes in relation of stage to discharge. The shifting character of the channel at the dam and the regulation of headgates to canal cause frequent changes in the rating curve. No estimates of discharge prepared. To obtain total flow of river, discharge of Bear River canal must be included.

Cooperation.—Gage-height record furnished by Pacific Gas & Electric Co.

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[1] Datum 5.18 feet higher.

Discharge measurements of Bear River and canal near Colfax, Cal., during the year ending Sept. 30, 1915.

[Made by Charles Leidl.]

Date.	Discharge at cable above dam.	Discharge wasted from canal above canal gage.	Discharge of canal.	Gage height at dam (left bank).	Discharge over dam.
	Sec.-ft.	*Sec.-ft.*	*Sec.-ft.*	*Feet.*	*Sec.-ft.*
Dec. 3 [a]	177	0	53	5.65	124
Jan. 28 [b]	574	0	59	5.83	515
Feb. 14 [c]	484	0	21	5.88	462
Apr. 15 [d]	518	0	70	5.52	448

[a] Measured by wading at 100 feet below dam.
[b] Measured by wading at 300 feet below dam.
[c] Measured at cable.
[d] Measured by wading at 150 feet below dam.

Daily gage height, in feet, of Bear River near Colfax, Cal., for the year ending Sept. 30, 1915.

Day.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.
1	5.7	5.65	5.55	5.2	7.6	6.3	5.8	5.8	5.9	5.3	5.55	5.5
2	5.75	5.5	5.55	5.2	7.75	6.1	5.7	5.75	5.8	5.2	5.5	5.45
3	5.65	5.7	5.7	5.25	6.7	5.95	5.7	5.5	5.7	5.05	5.5	5.45
4	5.6	5.75	5.6	5.5	6.55	5.95	5.75	5.4	5.8	5.1	5.45	5.5
5	5.75	5.55	5.65	5.45	6.1	5.85	5.7	5.4	5.75	5.1	5.45	5.5
6	5.75	5.65	5.7	5.55	5.85	5.8	5.7	5.85	5.75	5.15	5.45	5.5
7	5.7	5.6	5.75	5.6	5.8	5.7	5.9	5.45	5.7	5.25	5.5	5.55
8	5.65	5.55	5.55	5.75	6.85	5.7	5.25	5.35	5.65	5.4	5.45	5.55
9	5.6	5.6	5.6	5.7	7.05	5.65	5.45	5.95	5.65	5.45	5.5	5.55
10	5.7	5.7	5.65	5.6	6.75	5.6	5.5	6.85	5.7	5.5	5.45	5.5
11	5.45	5.65	5.75	5.5	6.65	5.6	5.4	7.8	5.6	5.45	5.45	5.5
12	5.6	5.65	5.65	5.6	6.25	5.65	5.45	7.7	5.6	5.4	5.45	5.5
13	5.65	5.75	5.6	5.65	6.1	5.65	5.6	7.5	5.6	5.45	5.55	5.5
14	5.6	5.7	5.45	5.65	5.95	5.6	5.4	6.85	5.5	5.35	5.5	5.55
15	5.65	5.65	5.45	5.65	5.8	5.5	5.35	6.85	5.4	4.9	5.5	5.55
16	5.65	5.7	5.5	5.5	6.05	5.5	5.45	6.45	5.35	5.25	5.45	5.4
17	5.55	5.75	5.55	5.45	7.25	5.55	5.55	6.45	5.25	5.3	5.45	5.55
18	5.55	5.7	5.55	5.4	7.0	5.55	5.6	6.5	5.25	5.0	5.45	5.5
19	5.7	5.65	5.5	5.4	6.7	5.6	5.65	6.85	5.2	5.2	5.45	5.5
20	5.75	5.65	5.45	5.3	6.65	5.6	5.65	6.8	5.2	5.05	5.5	5.5
21	5.5	5.7	5.35	5.3	6.3	5.6	5.7	6.7	5.45	5.05	5.45	5.55
22	5.65	5.6	5.4	5.25	6.4	5.75	5.65	6.55	5.25	5.35	5.45	5.45
23	5.65	5.5	5.4	5.05	6.45	5.65	5.6	6.4	5.3	5.4	5.45	5.45
24	5.8	5.5	5.4	5.1	6.45	5.6	5.55	6.25	5.7	5.45	5.5	5.4
25	5.45	5.45	5.3	5.35	6.4	5.6	5.5	6.2	5.7	5.5	5.45	5.45
26	5.6	5.55	5.0	5.4	6.3	5.75	5.55	5.95	5.5	5.5	5.4	5.55
27	5.7	5.5	5.2	5.6	6.2	5.8	5.5	6.05	5.4	5.55	5.4	5.5
28	5.65	5.5	5.1	5.8	6.5	5.85	5.65	6.1	5.45	5.55	5.45	5.55
29	5.75	5.35	5.15	5.7	....	5.95	5.75	5.9	5.5	5.6	5.45	5.45
30	5.7	5.55	5.05	5.75	....	5.8	5.8	5.85	5.35	5.55	5.5	5.55
31	5.65	....	5.1	6.05	....	5.65	....	5.75	....	5.55	5.5	....

BEAR RIVER AT VAN TRENT, CAL.

Location.—In the SE. ¼ sec. 21, T. 14 N., R. 6 E., below highway bridge at McCourtney crossing, 1 mile below Van Trent, Placer County, and 8 miles northeast of Wheatland.

Drainage area.—263 square miles.

Records available.—October 8, 1904, to September 30, 1915.

Gage.—Staff in five sections on left bank 500 feet below bridge; read once a day by Herman Ernestus.

Discharge measurements.—Made by wading or from cable half a mile below gage.

Channel and control.—Solid rock, boulders and gravel. Shifts during high water.

Extremes of discharge.—Maximum stage recorded during year, 10.6 feet at 9 a. m. February 2 (discharge, 12,700 second-feet); minimum stage recorded, 0.25 foot at 7 a. m. July 21 (discharge, 34 second-feet).

1904–1915: Maximum stage recorded, 18.9 feet at 8 a. m. January 14, 1909 (discharge, 29,600 second-feet, computed from extension of rating curve and may be subject to error); minimum stage recorded, 0.8 foot, August 28, 1913 (discharge, 8 second-feet).

Diversions.—Water is diverted above station for power and irrigation. Stored water from South Fork of Yuba River is diverted into this drainage above the Colfax station.

Regulation.—A small amount of storage is developed on the headwaters of this stream. Also see information in paragraph above.

Accuracy.—Results good.

Discharge measurements of Bear River at Van Trent, Cal., during the year ending Sept. 30, 1915.

Date.	Made by—	Gage height.	Discharge.	Date.	Made by—	Gage height.	Discharge.
		Feet.	*Sec.-ft.*			*Feet.*	*Sec.-ft.*
Nov. 22	H. J. Tompkins	1.79	209	May 21	H. J. Tompkins	3.22	1,420
Apr. 12	Charles Leidl	1.62	548				

Daily discharge, in second-feet, of Bear River at Van Trent, Cal., for the year ending Sept. 30, 1915.

Day.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.
1	192	170	180	79	4,800	1,660	845	463	541	288	85	49
2	140	140	102	72	9,880	1,400	775	486	495	242	75	41
3	245	205	355	72	5,500	1,150	742	419	452	256	66	57
4	205	160	192	355	3,200	1,070	775	398	432	200	57	66
5	94	275	390	170	2,460	990	710	398	411	95	66	66
6	192	160	192	260	1,760	880	845	379	372	187	57	57
7	150	218	180	290	1,480	775	775	326	392	242	57	66
8	120	160	218	820	4,270	710	710	360	392	228	57	85
9	120	79	170	660	5,360	648	710	398	354	187	66	95
10	260	218	320	305	5,920	710	590	2,770	337	320	57	161
11	160	230	320	218	3,540	619	648	4,940	320	242	49	95
12	86	205	355	470	2,040	590	619	12,700	304	115	41	200
13	160	260	205	390	1,480	590	710	3,430	304	256	49	137
14	102	245	140	2,200	1,230	590	648	2,640	242	213	66	115
15	120	230	160	710	1,070	648	563	1,950	372	213	75	161
16	160	94	160	390	1,480	679	590	1,660	354	57	57	115
17	205	260	180	290	5,640	648	590	2,040	242	161	57	105
18	150	275	192	260	5,360	679	536	3,310	271	228	66	115
19	245	205	205	218	3,320	648	440	3,430	320	57	57	115
20	320	260	260	180	3,660	648	563	1,960	372	149	49	137
21	275	245	180	170	2,350	619	486	1,580	304	34	57	161
22	86	218	150	150	1,850	648	486	1,220	320	41	66	126
23	192	86	130	140	1,940	679	463	1,060	288	49	57	161
24	205	120	111	120	2,350	710	398	988	271	66	57	149
25	192	102	102	160	1,760	648	563	914	320	66	49	161
26	79	111	94	260	1,400	679	440	741	288	66	57	174
27	205	79	102	290	1,230	648	463	677	304	57	49	126
28	230	150	86	1,830	2,880	845	379	646	115	57	57	174
29	260	140	94	1,550	....	1,230	419	646	200	85	49	149
30	192	72	86	765	....	1,150	775	566	242	95	57	187
31	205	....	94	1,060	....	1,030	....	541	....	66	41	....

Note.—Discharge determined from three rating curves applicable as follows: Oct. 1 to Feb. 2, fairly well defined between 160 and 4,000 second-feet; Feb. 3 to May 12, fairly well defined below 3,000 second-feet; May 13 to Sept. 30, fairly well defined below 5,000 second-feet.

Monthly discharge of Bear River at Van Trent, Cal., for the year ending Sept. 30, 1915.

Month.	Discharge in second-feet.			Run-off (total in acre-feet).	Accuracy.
	Maximum.	Minimum.	Mean.		
October	320	79	179	11,000	B.
November	275	72	179	10,700	B.
December	390	86	184	11,300	B.
January	2,200	72	481	29,600	B.
February	9,880	1,070	3,190	177,000	C.
March	1,660	590	813	50,000	B.
April	845	379	609	36,200	B.
May	12,700	326	1,740	107,000	C.
June	541	115	331	19,700	B.
July	320	34	149	9,160	B.
August	85	41	58.2	3,580	B.
September	200	41	120	7,140	B.
The year	12,700	34	653	472,000	

BEAR RIVER CANAL NEAR COLFAX, CAL.

Location.—In sec. 22, T. 15 N., R. 9 E., 750 feet below headgate at diversion dam on Bear River, about 3 miles north of Colfax, Placer County.

Records available.—January 1, 1912, to September 30, 1915.

Gage.—Float in stilling box on right side of flume about 40 feet below spillway.

Discharge measurements.—Made from foot plank across flume at gage.

Cooperation.—Daily-discharge record furnished by Pacific Gas & Electric Co.

The water is used for power near Auburn. There are waste gates in the canal about a mile below the diversion dam through which water is sometimes returned to the river.

Discharge measurements of Bear River canal near Colfax, Cal., during the year ending Sept. 30, 1915.

[Made by Charles Leidl.]

Date.	Gage height.	Discharge.	Date.	Gage height.	Discharge.
	Feet.	*Sec.-ft.*		*Feet.*	*Sec.-ft.*
Dec. 3	1.73	53	Feb. 14	1.02	21
Jan. 28	1.96	59	Apr. 15	2.31	70

Daily discharge, in second-feet, of Bear River canal near Colfax, Cal., for the year ending Sept. 30, 1915.

Day.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.
1	70	43	55	56	49	19.7	61	0	81	104	75	76
2	71	42	54	55	49	19.7	61	83	80	104	75	76
3	70	43	56	56	47	19.7	61	82	80	106	75	76
4	71	43	56	56	46	19.4	66	82	81	103	75	76
5	71	43	56	56	45	33	66	84	80	102	75	76
6	71	42	56	56	46	33	66	84	81	102	75	76
7	56	42	56	56	46	33	66	84	82	98	76	77
8	56	43	55	56	46	48	67	82	82	99	76	71
9	56	42	55	54	20	48	74	83	82	102	75	71
10	56	43	56	54	20	48	75	71	81	101	75	71
11	56	55	56	54	19.7	58	82	71	81	101	75	70
12	56	55	56	54	21	59	82	50	81	101	75	70
13	56	55	56	55	24	59	81	45	81	100	75	69
14	56	50	55	47	23	59	84	45	80	101	75	105
15	56	50	54	47	23	70	84	25	80	90	75	105
16	56	50	54	49	23	70	85	24	80	101	75	90
17	56	50	55	49	19.1	69	85	24	82	102	75	116
18	56	50	55	48	22	69	94	24	81	101	75	90
19	56	50	55	48	21	69	96	24	84	101	75	80
20	56	50	55	70	19.7	70	95	24	76	90	75	95
21	56	50	55	70	19.1	70	95	24	74	107	75	85
22	56	49	55	70	19.7	70	95	24	75	106	75	90
23	43	50	55	68	19.7	69	82	24	76	108	76	95
24	43	50	55	68	19.7	68	86	81	78	108	75	80
25	43	55	55	70	19.4	68	86	81	76	109	75	76
26	43	55	55	70	19.1	67	85	81	80	109	76	95
27	43	54	55	70	19.7	67	84	81	77	107	76	80
28	43	55	55	68	20	64	82	81	77	110	75	76
29	43	54	55	67	......	63	82	81	84	110	76	95
30	42	55	54	64	......	61	81	81	92	110	76	85
31	42	......	55	67	......	61	......	81	......	109	76	......

Monthly discharge of Bear River canal near Colfax, Cal., for the year ending Sept. 30, 1915.

Month.	Discharge in second-feet.			Run-off (total in acre-feet).
	Maximum.	Minimum.	Mean.	
October	71	42	55.0	3,380
November	55	42	48.9	2,910
December	56	54	55.2	3,390
January	70	47	59.0	3,630
February	49	19.1	28.1	1,560
March	70	19.4	54.9	3,380
April	96	61	79.6	4,740
May	84	0	58.4	3,590
June	92	74	80.2	4,770
July	110	90	103	6,330
August	76	75	75.3	4,630
September	116	69	82.8	4,930
The year	116	0	65.3	47,200

Note.—Monthly and yearly discharge computed by engineers of the U. S. Geological Survey.

NORTH FORK OF AMERICAN RIVER NEAR COLFAX, CAL.

Location.—In the SW. ¼ sec. 30, T. 14 N., R. 10 E., at bridge on Colfax-Forest Hill road, 150 feet below mouth of Shirttail Canyon Creek, 5 miles southeast of Colfax, Placer County, and 11 miles above junction with the Middle Fork.

Drainage area.—Not measured.

Records available.—August 16, 1911, to September 30, 1915.

Gage.—Vertical staff in two sections read once a day by H. P. Henning. Low-water section bolted to ledge on left bank 30 feet below bridge; high-water section wedged in crevice on right bank 35 feet below bridge. December 18, 1912, to

August 16, 1914, a Gurley printing electric water-stage recorder was in operation on the right bank 50 feet below the bridge and at the same datum.

Discharge measurements.—Made from bridge or by wading.

Channel and control.—Gravel and small boulders—tailings from placer mining; shifts during high water. Both banks are high, rocky, wooded, and not subject to overflow.

Extremes of discharge.—Maximum stage recorded during year, 11.2 feet at 3 p. m. May 11 (discharge, 13,200 second-feet); minimum stage recorded, 2.05 feet October 1, 2, 7, 8, 15 and November 17–20 (discharge, 62 second-feet).

1911–1915: Maximum stage recorded, 16.0 feet during morning of January 1, 1914, determined from high-water mark on gage in recorder well (discharge, 23,000 second-feet, computed from extension of rating curve and may be subject to error); minimum stage recorded, 3.12 feet September 24, 1913 (discharge, 51 second-feet).

Diversions.—A small ditch on the headwaters of the North Fork diverts water above the station.

Regulation.—None.

Accuracy.—Results good.

Discharge measurements of North Fork of American River near Colfax, Cal., during the year ending Sept. 30, 1915.

[Made by Charles Leidl.]

Date.	Gage height.	Discharge.	Date.	Gage height.	Discharge.
	Feet.	*Sec.-ft.*		*Feet.*	*Sec.-ft.*
Dec. 3	2.59	205	Feb. 14	4.02	905
Jan. 28	3.76	814	Apr. 15	5.06	1,700

Daily discharge, in second-feet, of North Fork of American River near Colfax, Cal., for the year ending Sept. 30, 1915.

Day.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.
1	62	115	80	90	4,970	1,310	1,480	1,480	2,660	615	114	74
2	62	110	80	102	5,520	1,160	1,670	1,160	2,540	588	114	74
3	70	105	90	102	2,330	940	2,090	1,080	2,780	560	105	74
4	67	102	210	175	1,480	875	2,330	1,010	2,200	510	105	74
5	67	102	145	145	1,010	875	1,670	940	2,420	510	105	74
6	64	90	210	175	875	875	1,480	1,160	2,200	460	105	74
7	62	80	175	175	750	875	1,480	1,480	2,660	413	105	74
8	62	74	145	325	1,570	842	1,390	1,570	2,780	390	105	74
9	74	74	115	305	2,450	810	1,480	3,440	2,090	368	105	74
10	76	74	210	210	1,980	780	1,570	8,510	2,310	347	105	74
11	72	70	192	160	1,670	750	1,670	13,200	1,800	347	97	74
12	70	70	160	245	1,010	750	1,770	9,140	1,620	326	97	74
13	68	67	145	415	940	780	2,580	5,330	1,620	307	97	74
14	66	67	130	950	875	875	1,570	4,610	1,710	254	89	74
15	62	64	115	745	810	1,080	2,580	3,760	1,540	223	89	74
16	64	64	115	305	1,080	1,230	1,870	3,600	1,450	206	89	74
17	70	62	130	245	4,430	1,480	2,580	4,260	1,370	194	89	74
18	100	62	130	228	2,990	1,480	2,710	3,920	1,290	194	86	74
19	115	62	115	210	2,330	1,480	2,210	3,600	1,220	181	86	74
20	160	62	115	192	2,090	1,480	2,330	3,030	1,220	181	86	74
21	145	64	102	175	1,670	1,480	2,090	2,900	1,140	168	86	74
22	115	64	102	175	1,670	1,670	1,870	2,540	1,140	168	82	71
23	90	64	102	192	1,570	1,670	1,670	2,780	1,070	156	82	71
24	80	64	90	160	1,480	1,770	1,570	2,660	1,000	156	82	71
25	80	64	90	175	1,480	1,670	1,480	2,540	865	145	74	71
26	80	64	90	160	1,310	1,670	1,230	2,660	735	145	74	71
27	78	64	102	210	1,160	1,770	1,010	2,780	705	134	74	71
28	76	70	102	778	1,670	3,140	2,330	2,660	675	134	74	71
29	76	90	102	810	......	2,450	2,710	2,900	675	124	74	71
30	90	90	90	778	......	1,670	2,450	2,900	645	114	74	71
31	115	......	90	950	......	1,390	......	2,420	......	105	74	......

Note.—Discharge determined from three rating curves fairly well defined below 5,000 second-feet, applicable Oct. 1 to Feb. 2, Feb. 3 to May 11, and May 12 to Sept. 30.

Monthly discharge of North Fork of American River near Colfax, Cal., for the year ending Sept. 30, 1915.

Month.	Discharge in second-feet.			Run-off (total in acre-feet).	Accuracy.
	Maximum.	Minimum.	Mean.		
October	160	62	81.9	5,040	B.
November	115	62	75.8	4,510	B.
December	210	80	125	7,690	B.
January	950	90	325	20,000	B.
February	5,520	750	1,900	106,000	B.
March	3,140	750	1,330	81,800	B.
April	2,710	1,010	1,900	113,000	B.
May	13,200	940	3,420	210,000	B.
June	2,780	645	1,600	95,200	B.
July	615	105	281	17,300	B.
August	114	74	91.1	5,600	B.
September	74	71	73.1	4,350	B.
The year	13,200	62	925	670,000	

AMERICAN RIVER AT FAIROAKS, CAL.

Location.—At highway bridge 1,500 feet northwest of Southern Pacific Co.'s railroad station at Fairoaks Bridge, half a mile southeast of Fairoaks, Sacramento County, and 10 miles below mouth of South Fork.

Drainage area.—1,910 square miles.

Records available.—November 3, 1904, to September 30, 1915.

Gage.—Gurley electric water-stage recorder (Pl. VIII, *B*, p. 246) on right bank 800 feet below bridge, installed January 18, 1914. Previously, several staff gages located at the right abutment of bridge had been used. The same datum has been maintained since station was established.

Discharge measurements.—Made from downstream side of bridge or by wading.

Channel and control.—Gravel and small boulders; shifts slightly during high water.

Extremes of discharge.—Maximum stage during year from water-stage recorder, 15.04 feet at 12.30 a. m., May 12 (discharge, 47,900 second-feet); minimum stage, 2.01 feet from 8 to 10.30 a. m., September 24 (discharge, computed from extension of low-water curve, 25 second-feet).

1907–1915: Maximum stage recorded, 30.4 feet, March 19, 1907 (discharge, 119,000 second-feet); minimum stage recorded, 2.01 feet from 8 to 10.30 a. m., September 24, 1915 (discharge computed from extension of low-water curve, 25 second-feet).

Diversions.—Water is diverted for irrigation above the station.

Regulation.—See descriptions of Middle, North, and South forks. Low-water flow partly regulated by power plant at Folsom.

Accuracy.—Water-stage recorder gave a great deal of trouble from December to April, August and September. It was running only 65 per cent of the year. Discharge for periods when the recorder was not running estimated from Weather Bureau gage heights at Folsom, by use of a relation curve and from a few staff gage readings at this station. Results fair.

Discharge measurements of American River at Fairoaks, Cal., during the year ending Sept. 30, 1915.

Date.	Made by—	Gage height.	Discharge.	Date.	Made by—	Gage height.	Discharge.
		Feet.	*Sec.-ft.*			*Feet.*	*Sec.-ft.*
Oct. 3	Charles Leidl	1.69	149	Apr. 17	Charles Leidl	7.74	13,200
Dec. 5	do	3.08	1,400	June 15	do	6.34	8,200
Jan. 22	H. J. Tompkins	2.68	770	Sept. 10	do	2.54	404
Feb. 13	Charles Leidl	5.06	4,850	11	do	2.22	148
Apr. 16	do	7.04	10,800				

Daily discharge, in second-feet, of American River at Fairoaks, Cal., for the year ending Sept. 30, 1915.

Day.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.
1	200	570	244	[a] 490	13,200	5,890	5,370	6,690	15,000	3,620	623	216
2	206	602	239	530	23,100	5,370	5,120	5,630	14,200	3,510	581	193
3	195	664	450	610	17,100	3,940	6,690	4,870	12,300	3,510	550	[a] 198
4	239	646	950	890	8,460	3,720	[a] 7,420	4,510	10,900	3,300	560	[a] 203
5	228	554	1,160	890	5,630	3,400	8,140	4,510	10,900	3,000	500	[a] 208
6	206	482	930	745	3,830	3,100	6,690	4,630	11,600	2,700	510	[a] 212
7	212	443	727	655	[a] 6,140	[a] 2,950	5,370	5,370	12,700	2,420	450	[a] 217
8	212	408	790	1,550	8,460	2,800	5,370	5,890	13,100	2,140	450	[a] 222
9	228	436	673	2,530	19,300	2,700	5,630	6,690	12,700	2,140	422	[a] 227
10	244	373	850	[a] 1,710	15,000	2,800	5,370	29,300	11,200	2,140	432	232
11	286	373	1,190	890	10,500	2,700	9,120	33,600	10,200	2,050	[a] 419	200
12	338	387	1,500	1,380	6,150	2,520	8,790	41,800	8,460	2,050	[a] 405	232
13	352	177	[a] 1,300	1,100	4,510	2,520	10,200	32,700	7,240	2,050	[a] 392	216
14	286	286	1,100	6,260	3,940	3,100	8,790	28,400	6,960	1,870	[a] 378	224
15	239	256	840	2,850	3,400	3,100	[a] 10,000	24,200	7,240	1,780	365	208
16	228	286	700	1,820	3,620	3,830	11,200	21,500	7,240	1,570	[a] 365	322
17	250	274	530	1,320	12,000	4,160	12,300	20,100	6,690	1,410	[a] 365	264
18	274	262	655	1,160	19,300	4,630	12,300	20,600	6,420	1,300	[a] 365	232
19	292	274	530	990	12,700	4,510	12,700	18,800	6,150	1,200	[a] 365	293
20	366	280	790	890	10,200	4,870	13,500	15,900	5,630	1,150	[a] 365	224
21	602	292	530	890	[a] 8,940	[a] 4,750	11,200	13,500	5,370	1,080	[a] 365	208
22	820	298	450	870	[a] 7,680	4,630	9,800	12,000	5,120	1,020	[a] 365	240
23	610	298	450	830	6,420	5,890	9,460	12,000	5,120	999	[a] 365	293
24	498	324	415	790	5,630	6,420	7,530	12,000	4,870	1,050	[a] 365	124
25	466	310	[a] 432	790	5,370	6,150	6,690	12,300	4,390	1,020	365	200
26	317	298	450	890	4,630	6,150	6,150	11,200	4,050	921	248	208
27	359	324	[a] 450	900	4,630	5,890	6,420	12,300	3,830	871	272	232
28	359	324	450	2,380	8,140	8,140	8,790	15,900	3,720	828	232	248
29	359	373	450	3,460		10,900	9,460	15,900	3,830	753	232	216
30	380	366	450	3,100		6,960	9,800	14,200	3,830	687	240	224
31	450		450	3,740		5,630		14,200		654	224	

[a] Interpolated.

NOTE.—Discharge determined from two rating curves as follows: Oct. 1 to Feb. 2, fairly well defined; Feb. 3 to Sept. 30, well defined between 70 and 600 and also between 4,000 and 16,000 second-feet. See remarks under "Accuracy" in station description.

Monthly discharge of American River at Fairoaks, Cal., for the year ending Sept. 30, 1915.

Month.	Discharge in second-feet.			Run-off (total in acre-feet).	Accuracy.
	Maximum.	Minimum.	Mean.		
October	820	195	332	20,400	A.
November	664	177	375	22,300	A.
December	1,500	239	681	41,900	C.
January	6,260	....	1,550	95,300	C.
February	23,100	3,400	9,210	512,000	C.
March	10,900	2,520	4,650	286,000	C.
April	13,500	5,120	8,510	506,000	C.
May	41,800	4,510	15,500	953,000	A.
June	15,000	3,720	8,030	478,000	A.
July	3,620	654	1,770	109,000	B.
August	623	224	391	24,000	B.
September	322	124	225	13,400	B.
The year	41,800	124	4,230	3,060,000	

MIDDLE FORK OF AMERICAN RIVER NEAR EAST AUBURN, CAL.

Location.—In the SE. ¼ sec. 6, T. 12 N., R. 9 E., at Mountain Quarry Co.'s plant about 1½ miles above the junction with North Fork of American River and 3½ miles northeast of East Auburn, Placer County.

Drainage area.—Not measured.

Records available.—October 22, 1911, to September 30, 1915.

Gage.—Staff in three sections on left bank at pump house, read once a day by H. M. Power.

Discharge measurements.—Made from car and cable 1 mile above gage or by wading.

Channel and control.—Composed of gravel and boulders; shifts during high water. Both banks are high and not subject to overflow.

Extremes of discharge.—Maximum stage recorded during year, 16.0 feet at 11.45 p. m. May 11 (discharge, 22,000 second-feet); minimum stage recorded, 1.3 feet October 1 to 6 (discharge, 58 second-feet).

1911–1915: Maximum stage recorded, 18.0 feet at 7 a. m. January 1, 1914 (discharge, 26,400 second-feet); minimum stage recorded, 1.3 feet September 30 to October 6, 1914 (discharge, 58 second-feet).

Diversions.—Little South Fork ditch takes from Gerle Creek and empties into Pilot Creek drainage. Pilot Creek ditch diverts Pilot Creek for irrigation on Georgetown divide. The former ditch is used to supplement the latter when the flow of Pilot Creek is not sufficient. Its maximum discharge is probably less than 20 second-feet.

Regulation.—Storage is developed in Loon Lake at the head of Gerle Creek to serve the ditches mentioned in the paragraph above.

Accuracy.—Results good. There were two shifts in the control during the year, but the rating curves are fairly well defined.

The following discharge measurement was made by Charles Leidl:

January 29, 1915: Gage height, 3.93; discharge, 1,220 second-feet.

Daily discharge, in second-feet, of Middle Fork of American River near East Auburn, Cal., for the year ending Sept. 30, 1915.

Day.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.
1	58	79	108	180	6,760	5,350	3,730	5,200	5,200	890	266	118
2	58	79	108	180	9,770	5,350	3,870	5,650	5,650	825	266	118
3	58	79	315	180	7,270	5,200	4,300	5,500	5,350	705	266	118
4	58	79	445	445	6,120	5,350	4,150	5,200	5,200	765	266	118
5	58	70	400	445	4,900	5,500	3,600	5,650	5,650	765	266	118
6	58	70	445	445	4,750	5,350	3,210	5,200	5,350	825	230	118
7	63	79	445	495	5,500	5,500	2,850	4,600	4,900	705	230	118
8	63	79	445	495	5,960	5,200	3,210	4,450	5,050	645	198	118
9	63	79	355	495	7,270	5,350	3,090	4,750	4,600	645	198	118
10	63	70	355	600	7,780	5,350	3,470	21,000	4,450	545	266	99
11	79	70	400	600	6,600	5,050	3,730	19,800	4,600	492	266	99
12	70	70	400	600	5,650	5,050	4,450	18,300	4,300	492	230	118
13	70	79	315	715	5,050	4,750	5,200	17,700	3,340	442	230	99
14	70	79	315	3,250	3,730	5,200	4,600	13,600	3,470	348	230	99
15	70	79	315	890	4,900	5,050	4,150	14,800	3,210	394	198	118
16	70	91	278	890	7,610	4,900	4,450	12,200	2,850	394	198	118
17	70	91	445	765	7,960	4,600	4,750	11,700	2,850	348	198	99
18	91	91	400	590	7,270	5,200	4,900	12,000	2,510	394	198	84
19	108	91	400	590	6,930	4,600	5,650	10,900	2,180	348	198	84
20	108	108	355	590	6,440	4,600	5,350	10,900	1,980	348	198	84
21	91	108	355	955	5,650	4,300	5,050	10,300	1,780	348	198	72
22	70	108	355	955	5,200	4,450	5,050	9,400	1,590	348	168	72
23	70	108	355	705	5,350	4,300	5,650	9,040	1,680	306	168	72
24	79	108	315	890	6,120	4,300	5,200	9,040	1,410	306	168	62
25	79	108	242	890	5,200	4,010	5,500	9,040	1,240	306	168	62
26	79	108	242	825	5,500	4,150	5,200	8,860	1,100	266	142	62
27	79	130	278	955	4,900	4,300	5,350	7,440	955	266	142	72
28	70	130	210	1,410	5,200	4,010	5,650	7,100	825	306	142	72
29	70	130	180	1,170	......	4,010	5,500	6,120	890	306	142	62
30	91	108	180	1,240	......	3,730	5,500	5,650	890	266	142	62
31	79	......	180	1,410	......	3,730	......	5,200	......	266	118	......

NOTE.—Discharge determined from three rating curves as follows: Oct. 1 to Jan. 14, fairly well defined below 7,000 second-feet; Jan. 15 to May 11, well defined below 7,000 second-feet; May 12 to Sept. 30, fairly well defined between 60 and 7,000 second-feet.

Monthly discharge of Middle Fork of American River near East Auburn, Cal., for the year ending Sept. 30, 1915.

Month	Discharge in second-feet.			Run-off (total in acre-feet).	Accuracy.
	Maximum.	Minimum.	Mean.		
October	108	58	73.0	4,490	C.
November	130	70	91.9	5,470	B.
December	445	108	321	19,700	B.
January	3,250	180	801	49,300	B.
February	9,770	3,730	6,120	340,000	A.
March	5,500	3,730	4,770	293,000	A.
April	5,650	2,850	4,550	271,000	A.
May	21,000	4,450	9,560	588,000	A.
June	5,650	825	3,170	189,000	B.
July	890	266	471	29,000	B.
August	266	118	203	12,500	B.
September	118	62	94.4	5,620	B.
The year	21,000	58	2,490	1,810,000	

SOUTH FORK OF AMERICAN RIVER NEAR PLACERVILLE, CAL.

LOCATION.—In the SE. ¼ sec. 26, T. 11 N., R. 10 E., 1,000 feet below bridge at Chilli Bar, on Placerville-Georgetown road, about 1,000 feet below Big Canyon Creek, and 3 miles northwest of Placerville, El Dorado County.

DRAINAGE AREA.—Not measured.

RECORDS AVAILABLE.—August 11, 1911, to September 30, 1915.

Gage.—Staff in two sections bolted to solid rock on right bank about 1,000 feet below bridge; high-water section painted on rocks above second section. Gage read once a day by M. M. Riggs.

Discharge measurements.—Made from downstream side of bridge or by wading.

Channel and control.—Gravel and boulders; appear permanent.

Extremes of discharge.—Maximum stage recorded during year: 13.50 feet at 7.45 a. m., May 10 (discharge, 7,980 second-feet); minimum stage recorded, 3.50 feet, October 1 and 2 (discharge, 78 second-feet).

1911–1915: Maximum stage recorded, 19.0 feet at 4 p. m., January 25, 1914 (discharge, 15,000 second-feet, computed from extension of rating curve and may be subject to error); minimum stage recorded, 3.28 feet, September 25, 1913 (discharge, 57 second-feet).

Diversions.—Just below the mouth of Silver Fork there is a diversion for irrigation, mining, and municipal supply for Placerville. Power is developed near mouth of Rock Creek by the Western States Gas & Electric Co. At low water, the entire flow of South Fork of American River is diverted for power. Occasionally the amount is insufficient, and additional water is purchased from the Sierra Water Supply Co. The water diverted for power is returned to the river above gaging station.

Regulation.—Echo and Silver lakes are used as storage reservoirs.

Accuracy.—No discharge measurements were made during the year ending September 30, 1915, but a measurement in November, 1915, at gage height 3.9 feet checks the rating curve used since the station was established. Results excellent.

Daily discharge, in second-feet, of South Fork of American River near Placerville, Cal., for the year ending Sept. 30, 1915.

Day.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.
1	78	246	121	162	3,260	1,480	1,890	2,200	6,090	1,820	306	101
2	78	246	128	162	3,840	1,340	2,040	1,960	5,760	1,820	275	121
3	89	356	472	153	2,370	1,220	2,540	1,890	4,770	1,890	393	128
4	89	246	260	322	1,600	1,100	2,720	1,740	4,240	1,680	246	121
5	89	194	393	206	1,340	1,100	2,370	1,740	4,660	1,480	232	114
6	89	162	232	232	1,100	1,040	2,280	1,890	4,990	1,340	219	114
7	95	153	306	246	925	980	2,200	2,120	5,100	1,160	206	108
8	101	144	232	232	1,220	980	2,040	2,200	5,100	1,040	206	108
9	101	144	172	432	3,000	925	2,040	2,540	5,100	1,040	183	101
10	144	144	206	246	2,370	980	2,460	7,980	5,210	980	183	101
11	206	128	393	194	1,890	1,100	2,820	6,780	4,440	980	172	101
12	144	128	260	356	1,410	1,040	3,360	7,740	3,540	1,100	162	101
13	114	128	183	322	1,220	980	3,640	7,620	3,000	1,040	162	108
14	114	121	144	1,680	1,100	1,040	2,720	6,780	3,180	980	153	114
15	114	128	144	730	980	1,160	2,640	4,880	3,640	875	144	114
16	101	128	206	472	1,040	1,340	3,260	5,540	3,540	825	144	114
17	101	128	144	393	2,040	1,480	3,840	5,650	3,180	730	144	108
18	128	121	260	306	3,640	1,600	4,140	5,760	3,180	685	144	101
19	128	114	194	290	2,200	1,600	4,340	4,660	3,080	685	136	101
20	206	114	162	290	2,200	1,680	4,550	4,040	2,720	596	144	95
21	472	108	206	290	1,740	1,820	3,740	3,640	2,640	575	128	95
22	290	108	162	246	1,600	1,890	3,450	3,740	2,720	554	121	89
23	206	108	232	206	1,600	2,040	3,260	4,040	2,720	554	114	114
24	162	108	172	194	1,480	2,120	2,540	3,740	2,460	596	114	95
25	153	108	183	275	1,410	2,120	2,540	3,540	2,200	575	114	95
26	144	108	162	260	1,340	2,120	2,200	3,640	1,890	512	114	114
27	136	108	162	246	1,220	1,890	2,370	4,990	1,890	472	114	101
28	128	114	183	775	1,740	2,040	3,260	5,650	1,890	412	114	101
29	128	128	162	875	....	2,370	3,180	5,980	1,960	393	108	95
30	162	128	162	875	....	2,040	2,900	5,320	2,040	356	108	95
31	232	....	162	980	....	1,890	....	5,210	....	322	101	....

Note.—Discharge determined from a well-defined rating curve.

Monthly discharge of South Fork of American River near Placerville, Cal., for the year ending Sept. 30, 1915.

Month.	Discharge in second-feet.			Run-off (total in acre-feet).	Accuracy.
	Maximum.	Minimum.	Mean.		
October	472	78	146	8,980	A.
November	356	108	147	8,750	A.
December	472	121	212	13,000	A.
January	1,680	153	408	25,100	A,
February	3,840	925	1,820	101,000	A.
March	2,370	925	1,500	92,200	A.
April	4,550	1,890	2,910	173,000	A.
May	7,980	1,740	4,360	268,000	A.
June	6,090	1,820	3,560	212,000	A.
July	1,820	322	905	55,600	A.
August	393	101	168	10,300	A.
September	128	89	106	6,310	A.
The year	7,980	78	1,350	974,000	

CLEAR LAKE AT LAKEPORT, CAL.

LOCATION.—At municipal wharf on north side of Third Street at Lakeport, Lake County.

RECORDS AVAILABLE.—January 1, 1913, to September 30, 1915.

GAGE.—Vertical staff fastened to piling at municipal wharf; read once a day by A. M. Crump.

EXTREMES OF STAGE.—Maximum stage recorded during year, 10.68 feet February 26; minimum stage recorded, 2.20 feet November 21, 24, and 28.

1913–1915: Maximum stage recorded, 11.12 feet January 28, 1914; minimum stage recorded, 0.62 foot, October 29, 1913.

COOPERATION.—Gage-height record furnished by Yolo Water & Power Co.

Daily gage height, in feet, of Clear Lake at Lakeport, Cal., for the year ending Sept. 30, 1915.

Day.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.
1	2.64	2.40	2.23	2.51	5.70	10.54	9.33	7.75	7.20	5.93	4.74	3.82
2	2.61	2.40	2.25	2.52	7.25	10.46	9.31	7.76	7.15	5.90	4.73	3.80
3	2.59	2.40	2.24	2.54	8.10	10.40	9.30	7.79	7.10	5.86	4.70	3.80
4	2.57	2.38	2.25	2.56	8.42	10.35	9.26	7.80	7.07	5.83	4.68	3.75
5	2.56	2.35	2.25	2.60	8.50	10.25	9.22	7.80	7.00	5.80	4.65	3.72
6	2.54	2.35	2.26	2.70	8.60	10.10	9.18	7.78	7.00	5.78	4.60	3.70
7	2.52	2.35	2.26	2.76	8.75	10.00	9.12	7.76	6.95	5.75	4.58	3.71
8	2.51	2.32	2.30	2.84	9.33	9.95	9.00	7.75	6.93	5.73	4.50	3.72
9	2.50	2.30	2.33	3.03	9.50	9.90	8.98	7.75	6.87	5.63	4.45	3.70
10	2.50	2.32	2.42	3.05	9.90	9.80	8.95	7.73	6.73	5.65	4.40	3.65
11	2.49	2.30	2.45	3.07	10.00	9.70	8.87	7.71	6.77	5.60	4.35	3.60
12	2.50	2.28	2.48	3.10	10.05	9.64	8.80	7.71	6.77	5.60	4.35	3.52
13	2.50	2.22	2.48	3.24	10.10	9.55	8.70	7.68	6.72	5.48	4.30	3.48
14	2.49	2.28	2.49	3.50	10.10	9.48	8.78	7.67	6.65	5.45	4.25	3.50
15	2.49	2.28	2.49	3.50	10.10	9.40	8.75	7.65	6.57	5.35	4.25	3.48
16	2.47	2.22	2.50	3.60	10.20	9.30	8.60	7.65	6.60	5.30	4.20	3.46
17	2.43	2.25	2.50	3.63	10.30	9.22	8.52	7.63	6.53	5.25	4.20	3.44
18	2.47	2.22	2.51	3.64	10.40	9.18	8.48	7.61	6.50	5.22	4.20	3.41
19	2.47	2.23	2.52	3.70	10.40	9.10	8.35	7.60	6.49	5.22	4.20	3.38
20	2.47	2.22	2.54	3.70	10.48	9.00	8.30	7.58	6.47	5.20	4.20	3.38
21	2.47	2.20	2.51	3.70	10.48	8.94	8.28	7.54	6.45	5.18	4.15	3.35
22	2.47	2.22	2.51	3.73	10.50	8.90	8.25	7.51	6.37	5.10	4.12	3.32
23	2.46	2.21	2.50	3.74	10.55	8.83	8.25	7.48	6.29	5.02	4.08	3.30
24	2.48	2.20	2.50	3.76	10.60	8.90	8.20	7.45	6.22	5.00	4.04	3.28
25	2.47	2.22	2.51	3.78	10.64	8.90	8.15	7.43	6.17	4.90	4.00	3.26
26	2.48	2.23	2.50	3.78	10.68	9.00	8.10	7.41	6.10	4.85	4.00	3.25
27	2.45	2.23	2.50	4.00	10.65	9.07	8.10	7.38	6.07	4.80	4.02	3.21
28	2.45	2.20	2.51	4.20	10.60	9.15	7.98	7.35	6.04	4.80	4.00	3.18
29	2.43	2.22	2.51	4.80	....	9.18	7.90	7.30	6.00	4.78	3.95	3.17
30	2.42	2.23	2.51	5.10	....	9.23	7.80	7.28	5.96	4.75	3.90	3.15
31	2.40	....	2.53	5.50	....	9.28	....	7.25	....	4.75	3.85	....

CACHE CREEK AT LOWER LAKE, CAL.

Location.—In the SE. ¼ SE. ¼ sec. 34, T. 13 N., R. 7 W., above highway bridge near outlet of Clear Lake, about 750 feet above mouth of Seigler Creek, and 1 mile north of Lower Lake, Lake County.

Drainage area.—500 square miles.

Records available.—January 1, 1901, to November 14, 1915, when station was discontinued.

Gage.—Vertical staff on left bank 800 feet above bridge; read once a day by Miss L. T. Anderson.

Discharge measurements.—Made from bridge or by wading. Flow of Seigler Creek is deducted when measurements are made from bridge.

Channel and control.—Gravel; fairly permanent.

Extremes of discharge.—Maximum stage recorded during year, 10.3 feet February 19 and 24 to 28 (discharge, 3,360 second-feet); minimum stage recorded, 2.25 feet November 30 (discharge, 50 second-feet).

1901–1915: Maximum stage recorded, 13.8 feet February 20, 1909 (discharge, 4,340 second-feet); no flow September 2–14 and 19–30, 1913, and November 18–29, 1914.

Diversions.—None.

Regulation.—At low water the channel is sometimes deepened in order to increase the flow from the lake.

Accuracy.—Results probably excellent, but there is no positive evidence that the rating curve has not changed since the last discharge measurement made November 1, 1914.

Discharge measurements of Cache Creek at Lower Lake, Cal., during the period Oct. 1, 1914, to Nov. 19, 1915.

Date.	Made by—	Gage height.	Discharge.	Date.	Made by—	Gage height.	Discharge.
1914.		*Feet.*	*Sec.-ft.*	1915.		*Feet.*	*Sec.-ft.*
Oct. 30	R. C. Rice	2.47	71	Nov. 19	H. D. McGlashan	....	[a] 3.0
Nov. 1	.....do	2.51	76				

[a] Leakage through temporary dam 300 feet below gage.

Daily discharge, in second-feet, of Cache Creek at Lower Lake, Cal., for the period Oct. 1, 1914, to Nov. 14, 1915.

Day.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.
1914-15.												
1	95	74	64	85	865	3,290	2,210	900	730	495	320	192
2	91	74	74	85	1,100	3,150	2,150	865	730	495	308	183
3	85	69	74	91	1,230	3,010	2,150	865	700	495	295	183
4	85	69	74	97	1,470	3,010	2,210	865	700	470	295	183
5	85	69	74	91	1,580	2,940	2,090	865	700	470	295	183
6	85	69	74	97	1,580	2,870	1,970	830	700	470	285	175
7	83	64	74	110	1,970	2,730	1,970	830	700	470	275	175
8	80	64	74	167	2,540	2,660	1,850	830	700	470	265	167
9	80	64	85	151	2,730	2,540	1,740	830	700	445	265	167
10	85	64	85	151	2,870	2,540	1,740	830	700	445	265	151
11	80	64	85	167	3,010	2,470	1,740	830	700	445	255	144
12	80	64	85	167	2,940	2,400	1,580	865	670	445	255	151
13	80	64	85	183	2,870	2,400	1,580	865	640	420	255	151
14	76	69	85	200	2,870	2,340	1,420	865	670	420	255	151
15	76	64	83	200	3,150	2,280	1,420	830	640	420	245	151
16	76	64	85	200	3,150	2,150	1,370	830	610	395	235	151
17	80	64	74	200	3,150	2,210	1,320	830	610	395	235	151
18	69	62	85	200	3,150	2,030	1,230	865	610	395	235	137
19	74	62	85	200	3,360	1,970	1,180	830	580	395	235	137
20	74	62	97	217	3,150	1,850	1,140	830	580	395	235	137
21	72	62	97	217	3,010	1,800	1,140	830	580	370	226	151
22	72	62	97	217	3,150	1,800	1,060	795	580	370	217	134
23	72	62	91	217	3,150	1,740	1,060	760	580	370	217	134
24	72	62	85	200	3,360	1,680	980	795	580	370	217	130
25	72	62	85	217	3,360	1,520	980	760	550	370	217	126
26	72	62	91	217	3,360	1,470	980	760	520	345	208	126
27	69	64	91	395	3,360	1,520	980	760	520	345	200	123
28	69	64	91	285	3,360	1,970	900	760	520	345	200	123
29	69	64	95	370	....	2,090	1,280	730	520	320	200	120
30	69	50	85	395	....	2,150	980	730	520	320	200	120
31	69	....	85	470	....	2,210	....	730	....	320	192	....

Day.	Oct.	Nov.	Day.	Oct.	Nov.	Day.	Oct.	Nov.
1915.								
1	120	87	11	107	91	21	97	....
2	120	87	12	104	85	22	97	....
3	110	87	13	104	85	23	97	....
4	110	85	14	100	85	24	91	....
5	110	85	15	97	....	25	91	....
6	110	87	16	97	....	26	91	....
7	110	85	17	97	....	27	91	....
8	110	85	18	97	....	28	91	....
9	110	95	19	97	....	29	97	....
10	110	91	20	97	....	30	87	....
						31	91	....

NOTE.—Discharge determined from a well-defined rating curve. Nov. 15, 1915, Yolo Water & Power Co. built a temporary dam about 300 feet below gage.

Monthly discharge of Cache Creek at Lower Lake, Cal., for the period Oct. 1, 1914, to Oct. 31, 1915.

[Drainage area, 500 square miles.]

Month.	Discharge in second-feet.				Run-off.		Accuracy.
	Maximum.	Minimum.	Mean.	Per square mile.	Depth in inches on drainage area.	Total in acre-feet.	
1914-15.							
October	95	69	77.3	0.155	0.18	4,750	A.
November	74	50	64.4	.129	.14	3,830	A.
December	97	64	83.7	.167	.19	5,150	A.
January	470	85	202	.404	.47	12,400	A.
February	3,360	865	2,670	5.34	5.56	148,000	A.
March	3,290	1,470	2,280	4.56	5.26	140,000	A.
April	2,210	900	1,480	2.96	3.30	88,100	A.
May	900	730	818	1.64	1.89	50,300	A.
June	730	520	628	1.26	1.41	37,400	A.
July	495	320	410	.820	.95	25,200	A.
August	320	192	245	.490	.56	15,100	A.
September	192	120	150	.300	.34	8,930	A.
The year	3,360	50	746	1.49	20.25	539,000	
1915.							
October	120	87	101	.202	.23	6,210	A.

CACHE CREEK AT YOLO, CAL.

Location.—At highway bridge half a mile south of Yolo, Yolo County, in Rio Jesus Maria grant, 1,000 feet above Southern Pacific Co.'s railroad bridge.

Drainage area.—1,320 square miles.

Records available.—January 1, 1903, to September 30, 1915.

Gage.—Staff in four sections; read twice a day by Mrs. Cornelia W. Bigelow. Lowest section is vertical and fastened to pile under bridge near left bank. Second section, which is inclined, is on right bank, 30 feet above bridge. Third section, vertical, is fastened to cottonwood tree on right bank 70 feet above bridge. Fourth section, vertical, is fastened to upper end of right abutment. This gage was installed October 2, 1904, at the same datum as the original gage on upstream side of right pier of bridge.

Didcharge measurements.—Made from bridge or by wading.

Channel and control.—Sand and gravel; somewhat shifting.

Extremes of discharge.—Maximum stage recorded during year and period 1903-1915, 27.3 feet at 5 p. m. February 2, 1915 (discharge, 21,100 second-feet computed from extension of rating curve and is subject to error); no flow for periods in nearly every year.

Diversions.—Numerous ditches divert water for irrigation above the station.

Regulation.—See Cache Creek at Lower Lake on page 276.

Accuracy.—Results good.

Discharge measurements of Cache Creek at Yolo, Cal., during the year ending Sept. 30, 1915.

[Made by Charles Leidl.]

Date.	Gage height.	Discharge.	Date.	Gage height.	Discharge.
	Feet.	*Sec.-ft.*		*Feet.*	*Sec.-ft.*
Jan. 27	2.34	451	June 15	2.60	517
Feb. 15	8.05	4,440	Sept. 9	1.02	12
Apr. 11	5.72	2,540			

Daily discharge, in second-feet, of Cache Creek at Yolo, Cal., for the year ending Sept. 30, 1915.

Day.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.
1	0.0	50	83	124	6,970	5,480	4,280	1,510	938	291	120	8.0
2	.0	60	83	124	19,300	5,160	3,960	1,440	938	272	120	8.0
3	.0	60	60	124	13,700	4,840	3,720	1,380	880	272	106	4.6
4	.0	72	60	124	6,290	4,680	3,560	1,440	824	254	92	4.6
5	.0	72	50	138	4,840	4,440	3,480	1,440	824	236	79	56
6	.0	83	40	186	4,040	4,280	3,240	1,380	824	218	68	47
7	.0	83	40	282	3,480	4,040	3,080	1,310	768	236	68	22
8	.0	83	40	476	9,180	3,960	2,920	1,250	714	350	68	15
9	.0	83	50	2,180	15,500	3,880	2,760	1,310	714	350	68	8.0
10	.0	83	50	805	8,160	3,720	2,680	1,720	661	310	56	2.6
11	.0	83	163	565	7,140	3,560	2,520	1,580	636	291	47	1.2
12	.0	65	202	565	5,320	3,480	2,440	1,860	610	254	47	.6
13	.0	50	186	542	5,160	3,400	2,440	1,720	562	207	38	.6
14	.0	50	163	960	4,680	3,240	2,280	1,580	517	183	38	.1
15	.0	50	138	1,240	4,520	3,240	2,210	1,510	474	183	47	.1
16	.0	50	138	855	5,080	3,080	2,140	1,440	432	166	47	.05
17	.0	50	144	610	12,400	3,000	2,070	1,380	390	183	47	.05
18	.0	15	169	520	7,650	2,920	2,000	1,510	370	200	38	.05
19	.0	.0	186	432	6,120	2,760	1,930	1,440	350	200	38	8.0
20	.0	.0	186	391	6,120	2,680	1,860	1,380	350	207	38	8.0
21	22	60	186	350	5,560	2,600	1,860	1,310	350	160	30	8.0
22	31	60	186	331	6,630	2,440	1,790	1,310	330	135	30	22
23	40	60	169	331	6,460	2,360	1,720	1,250	330	135	30	8.0
24	40	60	154	312	6,630	2,280	1,720	1,310	310	135	30	4.6
25	40	72	154	312	6,800	2,210	1,720	1,250	310	120	22	4.6
26	40	72	169	312	6,200	2,140	1,650	1,180	310	141	22	4.6
27	40	72	154	542	5,800	2,210	1,580	1,180	291	183	22	4.6
28	40	72	138	5,780	6,380	7,310	1,580	1,120	291	150	22	8.0
29	40	72	138	8,080	....	6,290	1,510	1,060	291	135	15	8.0
30	50	72	138	6,120	....	5,240	1,580	1,060	291	135	15	8.0
31	50	....	138	3,610	....	4,840	....	998	....	120	15	....

NOTE.—Discharge determined from two rating curves as follows: Oct. 21 to Feb. 2, fairly well defined; Feb. 3 to Sept. 30, well defined between 40 and 8,000 second-feet. No flow Oct. 1-20, Nov. 19 and 20.

Monthly discharge of Cache Creek at Yolo, Cal., for the year ending Sept. 30, 1915.

Month.	Discharge in second-feet.			Run-off (total in acre-feet).	Accuracy.
	Maximum.	Minimum.	Mean.		
October	50	0.0	14.0	861	D.
November	83	.0	60.5	3,600	C.
December	202	40	128	7,870	B.
January	8,080	124	1,200	73,800	B.
February	19,300	3,480	7,360	409,000	C.
March	7,310	2,140	3,730	229,000	A.
April	4,280	1,510	2,410	143,000	A.
May	1,860	998	1,370	84,200	A.
June	938	291	529	31,500	A.
July	350	120	207	12,700	A.
August	120	15	49.1	3,020	B.
September	56	.05	9.16	545	C.
The year	19,300	.0	1,380	999,000	

PUTAH CREEK AT WINTERS, CAL.

LOCATION.—Just below Southern Pacific Co.'s railroad bridge at Winters, Yolo County, in the Rio de los Putos grant.

DRAINAGE AREA.—805 square miles.

RECORDS AVAILABLE.—September 26, 1905, to September 30, 1915.

GAGE.—Staff in five sections on left bank, 600 feet below bridge. An auxiliary vertical staff on right bank is used for low water. The original location and gage datum have been maintained, although several changes in sections have been made.

Discharge measurements.—Made from cable at gage or by wading.

Channel and control.—Sand and gravel; somewhat shifting. Two channels at low water but the left channel usually carries very little water.

Extremes of discharge.—Maximum stage recorded during year, 30.0 feet at 8 a. m. February 2 (discharge, 40,400 second-feet, computed from extension of rating curve, and may be subject to error); minimum stage recorded, 4.05 feet at 4 p. m. October 1 (discharge, 6 second-feet).

1905–1915: Maximum stage recorded, 39.0 feet December 31, 1913, from flood marks at gage (discharge, 60,000 second-feet, computed from extension of rating curve, and may be subject to error); no flow during part of the years ending September 30, 1913 and 1914.

Diversions.—There are several small diversions for irrigation above the station.

Regulation.—None.

Accuracy.—Changes affecting the rating are fairly well defined by discharge measurements; results fair.

Discharge measurements of Putah Creek at Winters, Cal., during the year ending Sept. 30, 1915.

[Made by Charles Leidl.]

Date.	Gage height.	Discharge.	Date.	Gage height.	Discharge.
	Feet.	*Sec.-ft.*		*Feet.*	*Sec.-ft.*
Jan. 26	5.53	355	June 14	5.34	142
Feb. 16	8.65	2,680	Sept. 8	4.82	13
Apr. 10	6.78	745			

Daily discharge, in second-feet, of Putah Creek at Winters, Cal., for the year ending Sept. 30, 1915.

Day.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.
1	6	9	13	89	15,900	2,600	2,240	243	305	94	37	22
2	9	9	13	89	39,400	2,230	1,710	284	265	83	36	21
3	9	9	17	89	6,740	1,960	1,550	284	245	83	36	20
4	9	9	27	89	5,530	1,780	1,390	327	225	83	36	20
5	9	9	27	178	3,500	1,690	1,240	327	208	73	35	20
6	9	9	27	272	3,500	1,530	1,090	284	190	73	34	19
7	9	9	68	685	3,000	1.450	1,060	243	190	73	34	18
8	9	9	78	4,760	11,600	1,290	910	264	190	63	34	18
9	9	9	89	2,600	8,650	1,240	770	284	190	63	33	18
10	9	9	164	1,020	6,190	1,240	738	2,330	160	54	32	18
11	9	9	272	570	5,530	1,130	672	2,980	160	54	32	18
12	9	9	474	1,400	4,500	1,060	640	1,800	160	54	32	11
13	9	9	256	2,010	4,000	985	580	1,390	160	45	31	11
14	9	9	164	3,100	3,500	985	525	970	145	45	30	11
15	9	9	124	1,370	3,000	950	525	825	130	45	30	11
16	9	9	124	920	5,200	915	470	660	130	45	30	11
17	9	9	208	610	11,300	880	470	690	130	44	29	11
18	9	9	428	435	5,200	880	445	722	130	44	28	6
19	9	9	428	428	3,800	848	420	755	130	44	28	11
20	9	9	306	386	3,800	815	396	660	118	43	28	11
21	9	9	272	344	2,140	782	372	570	118	42	27	11
22	9	9	224	344	9,430	782	372	510	118	42	26	11
23	9	9	150	306	5,200	750	350	510	118	42	26	11
24	9	9	124	272	5,640	718	350	482	118	41	26	11
25	9	9	124	306	4,100	685	327	455	105	40	25	11
26	9	9	124	306	3,200	718	327	428	105	40	24	11
27	9	9	124	4,100	2,800	718	306	400	105	40	24	11
28	9	9	112	10,200	3,300	11,600	306	375	105	39	24	11
29	9	9	112	12,000	....	5,530	306	350	94	38	23	11
30	9	13	100	5,420	....	3,380	284	328	94	38	22	11
31	9	....	100	3,300	....	2,800	....	305	....	38	22	....

Note.—Discharge determined from six rating curves, most of which are well defined. Discharge, Feb. 5–7 and 12–15, estimated by comparison with record of flow of Cache Creek at Yolo. July 17 to Sept. 6 discharge estimated, owing to shifting of control.

Monthly discharge of Putah Creek at Winters, Cal., for the year ending Sept. 30, 1915.

Month.	Discharge in second-feet.			Run-off (total in acre-feet).	Accuracy.
	Maximum.	Minimum.	Mean.		
October	9	6	8.9	550	C.
November	13	9	9.1	540	C.
December	474	13	157	9,650	A.
January	12,000	89	1,870	115,000	B.
February	39,400	2,140	6,770	376,000	C.
March	11,600	685	1,770	109,000	A.
April	2,240	284	705	42,000	B.
May	2,980	243	679	41,800	B.
June	306	94	156	9,220	B.
July	94	38	53.1	3,260	C.
August	37	22	29.5	1,810	D.
September	22	6	13.9	827	C.
The year	39,400	6	980	710,000	

EEL RIVER BASIN.

EEL RIVER AT SCOTIA, CAL.

Location.—In sec. 18, T. 1 N., R. 1 E., at Wildwood bridge, about one-half mile northeast of Scotia, Humboldt County. Laribee Creek enters about 14 miles above and Van Duzen River 7 miles below the station.

Drainage area.—Not measured.

Records available.—December 15, 1910, to February 6, 1915.

Gage.—Staff in five sections read twice a day by A. Scatena. Section No. 1, inclined, on left bank under bridge; No. 2, vertical, spiked to right bank bridge pier; No. 3, vertical, spiked to left bank bridge pier, downstream side; No. 4, vertical, spiked to pile of left bank approach to bridge, 60 feet back of No. 3; No. 5, vertical, spiked to a small redwood tree. The gage as originally installed did not read below 10 feet. It was located at about the present location, but the bridge had not been built and the place was called Wildwood Ferry. A low-water section was installed and washed out several times. All sections were placed in their present positions October 13, 1914, the bridge having been completed shortly before. The datum has never been changed. The lowest sections of gage washed out February 7, 1915.

Discharge measurements.—Formerly made from ferry boat or by wading; now made from bridge.

Channel and control.—Solid rock and gravel; fairly permanent.

Extremes of discharge.—Maximum stage recorded during year, 55.5 feet at 8 a. m., February 2 (discharge, 290,000 second-feet, computed from extension of rating curve and may be subject to error); minimum stage recorded, 9.35 feet at 6 p. m., October 16 (discharge, 200 second-feet).

1911–1915: Maximum stage recorded, 55.5 feet, February 2, 1915 (discharge computed from extension of rating curve, 290,000 second-feet); minimum stage recorded, 9.42 feet, October 5 and 6, 1913 (discharge, 102 second-feet).

Diversions.—None.

Regulation.—None.

Accuracy.—Results good, except for extremely high stages. Rating curve fairly well defined and above 8,000 second-feet it has not changed since the station was established.

Discharge measurements of Eel River at Scotia, Cal., during the year ending Sept. 30, 1915.

[Made by Charles Leidl.]

Date.	Gage height.	Discharge.
	Feet.	*Sec.-ft.*
Oct. 14	9.42	219
14	9.42	220

Daily discharge, in second-feet, of Eel River at Scotia, Cal., for the period Oct. 1, 1914, to Feb. 6, 1915.

Day.	Oct.	Nov.	Dec.	Jan.	Feb.	Day.	Oct.	Nov.	Dec.	Jan.	Feb.
1	370	310	2,710	1,060	146,000	16	202	318	4,300	35,600	....
2	370	306	2,420	1,010	271,000	17	322	306	2,920	27,600	....
3	360	302	4,550	1,170	164,000	18	350	302	2,320	14,400	....
4	340	294	10,000	5,340	108,000	19	690	298	2,060	9,650	....
5	322	290	12,800	11,600	90,400	20	1,290	290	1,970	8,950	....
6	314	284	15,600	30,600	72,800	21	1,820	287	1,970	8,600	....
7	306	278	14,800	60,800	....	22	960	284	1,900	8,300	....
8	298	272	19,000	81,900	....	23	564	278	1,820	8,000	....
9	284	266	22,100	65,600	....	24	420	275	1,750	8,000	....
10	275	260	27,600	39,100	....	25	390	272	1,680	7,700	....
11	233	260	21,200	37,600	....	26	365	263	2,420	12,800	....
12	222	306	12,800	39,100	....	27	350	260	2,060	53,000	....
13	214	370	8,600	39,600	....	28	350	284	1,290	43,700	....
14	218	425	7,400	79,300	....	29	330	620	1,170	56,000	....
15	310	340	5,900	51,400	....	30	322	1,610	1,120	68,000	....
						31	314	....	1,060	79,300	....

Note.—Discharge determined from a fairly well defined rating curve.

Monthly discharge of Eel River at Scotia, Cal., for the period Oct. 1, 1914, to Feb. 6, 1915.

Month.	Discharge in second-feet.			Run-off (total in acre-feet).	Accuracy.
	Maximum.	Minimum.	Mean.		
October	1,820	202	431	26,500	C.
November	1,610	260	350	20,800	B.
December	27,600	1,060	7,070	435,000	B.
January	81,900	1,010	32,100	1,970,000	B.
February 1-6	271,000	72,800	142,000	1,690,000	C.
The period				4,140,000	

MIDDLE EEL RIVER NEAR COVELO, CAL.

Location.—In the E. ½ sec. 36, T. 23 N., R. 12 W., near Covelo ranger station, and about 6 miles east of Covelo, Mendocino County. Williams Creek enters about half a mile above the station.

Drainage area.—Not measured.

Records available.—August 22, 1911, to September 30, 1915.

Gage.—Staff in two sections on left bank, about one-fourth mile west of ranger station and 1 mile below bridge; read once a day by C. W. Brereton. Several changes in sections have been made, but original location and datum have been maintained.

Discharge measurements.—Made from car and cable, 300 feet above gage.

Channel and control.—Small boulders and gravel; fairly permanent.

Extremes of discharge.—Maximum stage recorded during year, 25.0 feet at 6 p. m. February 1 (discharge, 26,200 second-feet, determined from extension of rating curve, and is subject to error); minimum stage recorded, 6.9 feet at 8 a. m. September 12 (discharge, 2.5 second-feet).

1911–1915: Maximum stage recorded between 30 and 31 feet at 4.30 p. m. December 31, 1913 (discharge, between 41,500 and 47,100 second-feet). Flood over top of gage and washed out high-water section. Minimum stage recorded, 6.9 feet at 8 a. m. September 12, 1915 (discharge, 2.5 second-feet).

Diversions.—None.

Regulation.—None.

Accuracy.—Results fair.

Cooperation.—Gage-height record furnished by United States Forest Service.

Discharge measurements of Middle Eel River near Covelo, Cal., during the year ending Sept. 30, 1915.

[Made by Charles Leidl.]

Date.	Gage height.	Discharge.
	Feet.	*Sec.-ft.*
Oct. 10	8.47	98
10	8.44	94

Daily discharge, in second-feet, of Middle Eel River near Covelo, Cal., for the year ending Sept. 30, 1915.

Day.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.
1	14	59	97	140	26,200	1,930	[a]3,430	[a]2,260	2,150	[a]370	46	18
2	14	59	162	140	6,530	1,820	[a]3,480	[a]2,110	2,040	[a]333	46	18
3	14	59	293	484	[a]5,770	1,720	3,530	[a]1,960	1,720	[a]296	40	15
4	14	51	310	646	[a]5,010	1,720	4,100	[a]1,810	1,540	[a]259	40	15
5	14	44	260	590	4,250	1,620	3,950	[a]1,660	1,720	[a]223	40	12
6	14	44	244	1,390	3,120	1,620	3,390	[a]1,510	[a]1,720	[a]187	35	12
7	16	44	293	890	3,950	1,540	3,390	1,360	1,720	151	35	9.7
8	16	38	310	3,810	7,430	1,540	3,390	1,360	1,440	151	35	7.5
9	16	41	260	826	[a]5,630	1,440	3,250	6,190	1,280	151	35	5.5
10	24	41	293	704	[a]3,830	1,440	2,990	10,700	1,120	132	30	5.5
11	51	41	260	675	2,040	1,360	2,730	8,330	890	132	30	3.9
12	38	41	229	1,310	1,720	1,540	2,610	4,870	820	115	30	2.5
13	32	41	200	4,250	1,540	1,720	2,610	3,120	750	115	28	[a]3.5
14	22	51	162	3,950	1,540	2,040	2,490	2,860	685	115	28	[a]4.5
15	22	44	120	1,470	2,150	2,150	2,370	2,610	685	115	26	[a]5.5
16	22	44	120	890	2,860	2,610	[a]2,540	2,150	750	107	26	[a]6.5
17	51	38	130	826	6,530	2,730	[a]2,710	[a]3,120	[a]710	107	22	7.5
18	104	38	130	826	3,810	2,860	[a]2,880	4,100	[a]680	107	22	8.6
19	618	38	140	764	3,390	2,990	[a]3,050	[a]3,810	[a]650	99	22	9.7
20	293	38	140	704	2,730	3,390	[a]3,220	[a]3,520	620	92	22	9.7
21	214	38	120	646	2,040	4,100	3,390	[a]3,230	[a]589	85	20	9.7
22	140	38	167	536	2,490	3,950	3,390	[a]2,940	[a]558	79	20	9.7
23	78	38	158	484	2,730	3,670	3,120	[a]2,650	[a]527	73	20	9.7
24	68	27	140	484	2,860	3,530	2,610	2,370	[a]497	68	20	12
25	59	27	130	484	2,990	3,390	2,150	1,040	[a]467	63	20	12
26	51	22	136	590	2,370	2,990	2,040	2,150	[a]437	58	20	12
27	44	27	140	955	2,150	[a]5,660	1,820	2,730	407	54	20	12
28	41	120	120	2,110	1,930	8,330	2,730	2,730	407	50	20	12
29	38	120	130	3,670	....	5,190	[a]2,570	2,610	407	46	20	12
30	38	90	140	4,250	....	4,100	[a]2,410	[a]2,450	407	46	20	12
31	41	....	144	6,360	....	3,390	....	[a]2,300	....	46	20	....

[a] Interpolated.

Note.—Discharge determined from two rating curves applicable as follows: Oct. 1 to Feb. 1, well-defined below 8,000 second-feet; Feb. 2 to Sept. 30, not well defined. Discharge Jan. 1 and 2 estimated by comparison with Eel River at Scotia.

Monthly discharge of Middle Eel River near Covelo, Cal., for the year ending Sept. 30, 1915.

Month.	Discharge in second-feet.			Run-off (total in acre-feet).	Accuracy.
	Maximum.	Minimum.	Mean.		
October	618	14	71.6	4,400	B.
November	120	22	48.0	2,860	B.
December	310	97	183	11,300	B.
January	6,360	140	1,480	91,000	B.
February	26,200	1,540	4,270	237,000	C.
March	8,330	1,360	2,840	175,000	C.
April	4,100	1,820	2,940	175,000	C.
May	10,700	1,040	3,120	192,000	C.
June	2,150	407	946	56,300	C.
July	370	46	130	7,990	C.
August	46	20	27.7	1,700	C.
September	18	2.5	9.77	581	C.
The year	26,200	2.5	1,320	955,000	

KLAMATH RIVER BASIN.

WILLIAMSON RIVER AT CHILOQUIN, OREG.

LOCATION.—In the NW. ¼ sec. 3, T. 35 S., R. 7 E., at highway bridge about 500 feet above mouth of Sprague River and one-half mile southwest of Chiloquin, Klamath County.

DRAINAGE AREA.—1,260 square miles.

RECORDS AVAILABLE.—July 25, 1911, to September 30, 1915.

GAGE.—Vertical staff on upstream side of right abutment of wagon bridge, except March 29 to July 16, 1915, when a temporary gage on downstream side of abutment was used. Gage read once practically every day up to June 30, 1915, and about twice a week thereafter by United States Indian Service employees.

DISCHARGE MEASUREMENTS.—Made from upstream side of wagon bridge; measuring conditions poor on account of rough bottom and irregular velocities.

CHANNEL AND CONTROL.—Rocks and gravel; practically permanent. A second channel to the left of the main channel always carries some water; banks low and subject to overflow at extremely high stages.

EXTREMES OF DISCHARGE.—Maximum stage recorded during year, 5.30 feet March 27 to 31 and April 4 and 6 (discharge, 1,420 second-feet); minimum stage recorded, 3.80 feet August 20, 21, and 30, and September 12 and 16 (discharge, 370 second-feet).

1911–1915: Maximum stage recorded, 6.6 feet April 16, 1913 (discharge, 2,520 second-feet); minimum stage recorded, 3.80 feet August and September, 1915 (discharge, 370 second-feet).

WINTER FLOW.—Stage discharge relation unaffected by ice as most of the water comes from springs.

DIVERSIONS.—Practically none.

REGULATION.—None.

ACCURACY.—Results good.

COOPERATION.—Field data furnished by United States Indian Irrigation Service, H. W. Hincks, project engineer.

Discharge measurements of Williamson River at Chiloquin, Oreg., during the year ending Sept. 30, 1915.

Date.	Made by—	Gage height.	Discharge.	Date.	Made by—	Gage height.	Discharge.
		Feet.	*Sec.-ft.*			*Feet.*	*Sec.-ft.*
Oct. 29	F. F. Henshaw	4.25	509	June 27	F. F. Henshaw	4.04	464
Apr. 6	Bostwick and Bullard	5.30	1,450	Aug. 26	N. Bostwick	3.81	372
June 26	F. F. Henshaw	4.07	475				

Daily discharge, in second-feet, of Williamson River at Chiloquin, Oreg., for the year ending Sept. 30, 1915.

Day.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.
1	510	585	638	585	585	635	1,420	810	610	470	404	375
2	510	635	690	585	545	690	1,420	810	610	470	402	378
3	510	635	690	585	585	635	1,420	810	610	470	406	378
4	510	635	690	585	545	635	1,420	810	610	470	410	378
5	510	635	690	585	545	690	1,420	810	550	470	410	378
6	510	635	690	585	545	690	1,420	810	550	470	409	378
7	510	635	690	585	545	690	1,390	810	550	465	408	378
8	510	635	690	585	545	750	1,350	740	550	465	407	374
9	510	635	690	585	545	750	1,320	740	550	462	406	373
0	510	635	690	585	545	750	1,290	717	550	460	406	372
11	510	635	690	585	545	750	1,260	694	525	455	408	371
12	510	635	690	585	545	750	1,230	670	525	450	400	370
13	510	635	690	585	545	750	1,140	670	525	447	398	372
14	510	635	690	545	545	820	1,140	670	525	445	395	375
15	510	690	690	545	545	820	1,140	670	525	442	392	378
16	510	635	635	545	585	890	1,140	670	525	442	390	370
17	510	635	635	545	585	970	1,140	670	525	442	386	372
18	585	635	635	545	585	1,010	1,140	670	525	442	382	375
19	585	690	635	545	585	1,050	1,050	670	512	442	376	378
20	585	635	610	545	585	1,140	1,050	670	500	437	370	378
21	585	690	585	545	585	1,230	970	670	500	431	370	378
22	585	690	585	545	585	1,320	970	670	500	426	372	378
23	585	690	585	545	585	1,320	970	670	500	430	374	378
24	585	690	585	545	585	1,340	970	670	500	426	378	378
25	585	690	585	545	635	1,370	970	670	500	422	378	378
26	585	690	585	545	635	1,400	970	670	485	418	374	378
27	585	690	585	545	635	1,420	890	610	470	415	373	378
28	585	690	585	585	585	1,420	850	670	470	413	372	378
29	585	638	585	545	......	1,420	810	610	470	410	371	378
30	585	585	585	545	......	1,420	810	610	470	408	370	378
31	585	......	585	545	......	1,420	......	610	......	406	373	......

NOTE.—Discharge determined from two well-defined rating curves applicable Oct. 1 to Apr. 6 and Apr. 7 to Sept. 30.

Monthly discharge of Williamson River at Chiloquin, Oreg., for the year ending Sept. 30, 1915.

Month.	Discharge in second-feet.			Run-off (total in acre-feet).	Accuracy.
	Maximum.	Minimum.	Mean.		
October	585	510	544	33,400	B.
November	690	585	650	38,700	B.
December	690	585	641	39,400	B.
January	585	545	563	34,600	B.
February	635	545	572	31,700	B.
March	1,420	635	998	61,400	B.
April	1,420	810	1,150	68,400	B.
May	810	610	701	43,100	B.
June	610	470	527	31,400	A.
July	470	406	443	27,200	A.
August	410	370	389	23,900	A.
September	378	370	376	22,400	A.
The year	1,420	370	629	456,000	

UPPER KLAMATH LAKE NEAR KLAMATH FALLS, OREG.

Location.—In sec. 30, T. 38 S., R. 9 E., at the outlet of Upper Klamath Lake, about 2 miles northwest of Klamath Falls, Klamath County.

Records available.—May 28 to October 22, 1904; January 7, 1906, to September 30, 1915.

Gage.—Friez water-stage recorder since February 16, 1906; vertical staff prior to that date. Zero of gage is 4,136.13 feet above sea level. Observer, Graham Keihl.

Extremes of stage.—Maximum stage during year from water-stage recorder, 6.79 feet at 9 p. m. April 29; lowest stage from water-stage recorder, 3.66 feet at 9 p. m. August 15, when a strong south wind held the water back.

Fluctuation.—Gage heights are very much affected by the wind. The water is lowered near the outlet when the wind blows from the south and is raised as much above its normal level when the wind is in the opposite direction. There is a periodic oscillation when the wind blows for any length of time.

Cooperation.—Since May, 1909, this station has been maintained by United States Reclamation Service.

Daily gage height, in feet, of Upper Klamath Lake near Klamath Falls, Oreg., for the year ending Sept. 30, 1915.

Day.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.
1	4.36	4.42	4.91	4.85	5.00	......	5.50	5.60	5.25	......	4.05	......
2	4.36	4.60	5.15	4.85	5.11	......	5.48	......	......	......	4.06	......
3	4.50	4.68	5.10	4.85	5.00	5.00	5.60	......	......	4.30	......	4.05
4	4.60	4.66	5.00	4.85	......	......	5.80	......	......	4.35	......	4.00
5	4.62	4.72	4.74	4.85	......	......	5.78	......	4.90	......	......	4.01
6	4.65	4.85	4.85	4.85	4.96	5.00	5.60	......	......	......	......	4.06
7	4.65	4.82	4.85	4.86	5.02	5.03	5.64	......	......	......	3.97	4.09
8	4.65	4.84	4.85	4.90	5.02	5.01	......	4.90	......	......	4.04	4.06
9	4.70	4.87	4.85	4.90	5.00	5.05	......	5.10	......	......	4.04	4.10
10	4.65	4.90	4.86	4.90	5.00	5.05	5.60	5.23	......	4.35	4.07	4.15
11	4.75	4.90	4.85	5.10	5.00	5.05	5.71	5.20	......	......	4.10	3.98
12	4.75	4.90	4.80	4.90	5.00	5.04	5.83	......	4.75	......	4.10	4.02
13	4.72	......	4.88	4.90	5.00	5.00	6.14	......	......	......	4.10	3.98
14	4.72	4.85	4.82	4.90	......	5.06	5.92	......	4.80	......	4.10	3.95
15	4.68	4.90	4.82	4.90	......	5.10	5.68	5.10	4.70	......	4.08	4.02
16	4.44	4.90	4.84	4.90	......	5.14	5.60	5.02	......	......	4.15	4.00
17	4.60	4.95	4.84	4.90	......	5.20	5.59	......	......	4.20	4.12	3.98
18	4.64	5.00	4.84	4.90	......	5.20	......	......	......	......	4.09	4.00
19	4.85	5.00	4.85	4.90	......	5.20	......	......	4.68	......	4.08	4.02
20	4.88	5.00	4.85	4.85	5.00	5.20	5.80	5.10	4.85	......	4.03	4.00
21	4.84	4.85	4.85	4.85	5.05	5.20	5.84	5.20	4.75	......	4.06	4.04
22	4.83	4.80	4.85	4.85	5.05	......	5.78	5.20	4.79	4.25	4.07	......
23	4.81	4.82	4.85	4.85	......	......	5.65	5.30	4.72	4.19	4.05	......
24	4.72	4.85	4.85	4.85	......	......	5.35	5.30	......	4.12	4.10	3.80
25	4.75	4.85	4.85	4.85	......	......	5.50	......	......	......	4.05	3.92
26	4.76	4.85	4.85	4.85	......	......	......	5.29	4.40	......	4.02	4.06
27	4.78	4.78	4.85	4.87	5.05	5.20	......	......	......	......	4.03	4.11
28	4.77	4.72	4.85	4.90	5.05	5.42	5.70	......	......	......	......	4.10
29	4.76	4.90	4.85	4.90	......	5.50	6.20	5.15	......	......	......	4.05
30	4.62	4.91	4.85	4.90	......	5.45	6.12	5.20	......	......	4.06	4.08
31	4.36	......	4.85	4.90	......	5.53	......	5.21	......	4.05	......	......

LINK RIVER AT KLAMATH FALLS, OREG.

Location.—In the NW. ¼ sec. 32, T. 38 S., R. 9 E., 500 yards upstream from county bridge over Link River, at Klamath Falls, Klamath County, 1¼ miles below the outlet of Upper Klamath Lake, and immediately above the head of Lake Ewanna.

Drainage area.—3,110 square miles.

Records available.—May 15, 1904, to September 30, 1915.

Gage.—Friez water-stage recorder on left bank, about 500 yards above bridge in NW. ¼ sec. 32; elevation of zero is 4,080.0 feet above sea level. Friez recorder on opposite bank and a little farther upstream was used June 6, 1908, to August 30, 1912. A chain gage on the bridge has been read daily since 1904, and has been used for obtaining the discharge for periods when gage heights are not available for the other gage. Observer, Myrtle Ess.

DISCHARGE MEASUREMENTS.—Made from bridge.

CHANNEL AND CONTROL.—Rocks and boulders in rapids; clay and sand at bridge. The control for the gage is evidently permanent and water from the tailrace of the California-Oregon Power Co.'s plant, which enters the river opposite the gage, appears to affect gage heights in the same manner as if it came down the river channel. The stage-discharge relation of the chain gage is affected by backwater from Lake Ewanna, especially when the wind is blowing.

EXTREMES OF DISCHARGE.—Maximum stage during year from water-stage recorder, 7.29 feet at 12 m. April 29 (discharge, 3,960 second-feet); minimum stage during year and since September, 1912, 4.75 feet at 9 a. m. August 15 (discharge, 655 second-feet).

1904–1916: Maximum stage, 7.30 feet at gage at bridge May 12, 1904, determined May 15, 1904, from high-water marks (discharge, 9,400 second-feet); minimum stage is due to effect of wind on Upper Klamath Lake, and river is said to have gone nearly dry at times.

WINTER FLOW.—Stage-discharge relation not affected by ice.

DIVERSION.—The main or "A" canal of the Klamath project of the United States Reclamation Service diverts from Link River immediately below the lower end of Upper Klamath Lake. For record of this diversion see page —. Some water is also diverted for irrigation from the tributaries to Upper Klamath Lake, but the total run-off is as yet practically unaffected.

REGULATION.—The only artificial regulation is caused by operation of power plant and is small. Marked natural fluctuations are caused by effect of wind on Upper Klamath Lake.

ACCURACY.—Results good.

COOPERATION.—Most of field data furnished by United States Reclamation Service, J. G. Camp, project engineer.

Discharge measurements of Link River at Klamath Falls, Oreg., during the year ending Sept. 30, 1915.

Date.	Made by—	Gage height.	Discharge.	Date.	Made by—	Gage height.	Discharge.
		Feet.	*Sec.-ft.*			*Feet.*	*Sec.-ft.*
Oct. 25	F. F. Henshaw	5.70	1,630	June 9	C. P. Hughes	5.94	1,880
Apr. 9	Humphrey & Hughes	6.74	3,080	July 31	H. W. Humphrey	5.02	825
27	C. P. Hughes	6.59	2,810	Aug. 25	A. R. Leavitt	5.04	911
May 1	do	6.38	2,320				

Daily discharge, in second-feet, of Link River at Klamath Falls, Oreg., for the year ending Sept. 30, 1915.

Day.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.
1	1,110	1,480	1,660	1,870	2,070	2,210	2,660	2,880	2,140	1,210	885	935
2	1,060	1,560	1,710	1,870	2,210	2,140	2,730	2,660	2,140	1,240	882	930
3	1,110	1,640	1,710	1,870	2,210	2,140	2,880	2,580	2,140	1,230	882	962
4	1,210	1,640	1,690	1,870	2,000	2,210	2,960	2,580	2,140	1,230	889	846
5	1,280	1,710	1,740	1,860	2,000	2,140	3,030	2,500	2,090	1,280	823	890
6	1,280	1,790	1,740	1,870	1,970	2,140	2,880	2,430	2,050	1,210	900	855
7	1,280	1,710	1,740	1,870	1,940	2,140	2,880	2,360	2,000	1,180	910	973
8	1,300	1,660	1,750	1,910	1,960	2,140	2,960	2,280	1,960	1,250	945	906
9	1,250	1,680	1,740	1,910	1,970	2,140	3,030	2,360	1,910	1,280	960	922
10	1,160	1,680	1,880	1,910	1,970	2,140	3,030	2,360	2,280	1,250	962	970
11	1,290	1,660	1,920	1,970	1,970	2,140	3,030	2,500	1,920	1,230	1,000	846
12	1,340	1,580	1,920	1,940	1,970	2,140	3,110	2,580	1,640	1,250	980	880
13	1,380	1,710	1,920	1,940	1,970	2,140	3,350	2,580	1,710	1,230	960	825
14	1,450	1,710	1,920	2,000	1,970	2,070	3,190	2,500	1,660	1,130	922	810
15	1,390	1,740	1,920	2,000	1,970	2,070	3,110	2,580	1,960	1,130	906	903
16	1,330	1,740	1,910	2,000	1,940	2,140	3,030	2,500	1,860	1,130	950	860
17	1,000	1,750	1,900	2,000	1,970	2,210	3,030	2,360	1,770	1,090	972	864
18	1,340	1,740	1,940	1,960	2,000	2,210	2,960	2,430	1,680	1,050	950	860
19	1,180	1,740	1,940	1,940	2,000	2,210	2,960	2,360	1,580	1,060	960	863
20	1,480	1,740	1,940	1,880	2,000	2,280	2,960	2,280	1,480	1,020	886	855
21	1,480	1,740	1,940	1,870	2,000	2,430	3,030	2,430	1,490	1,000	855	886
22	1,580	1,740	1,940	1,900	2,000	2,430	2,960	2,360	1,430	960	810	890
23	1,610	1,740	1,920	1,940	2,000	2,500	2,880	2,280	1,360	920	802	973
24	1,610	1,770	1,920	1,920	2,070	2,580	2,800	2,280	1,450	910	810	1,100
25	1,610	1,770	1,920	1,940	2,070	2,580	2,800	2,280	1,350	1,000	846	940
26	1,600	1,740	1,920	1,910	2,070	2,360	2,880	2,280	1,330	984	855	930
27	1,600	1,350	1,920	1,940	2,070	2,360	2,880	2,280	1,380	907	882	948
28	1,600	1,540	1,920	1,960	2,140	2,500	2,800	2,210	1,350	859	864	962
29	1,600	1,660	1,870	1,970	....	2,580	3,350	2,210	1,250	795	900	910
30	1,530	1,660	1,870	1,950	....	2,660	3,190	2,210	1,220	874	1,000	930
31	1,450	....	1,870	1,940	....	2,580	....	2,140	....	828	855	....

NOTE.—Discharge determined from a rating curve well defined between 800 and 4,000 second-feet. Discharge, Mar. 28 to Apr. 2, May 2-10, and May 17-21, computed from readings on chain gage at bridge. Discharge, June 1-3, 5-8, and 16-18 interpolated, as recorder was not working. Discharge, July 18 to Aug. 20 and Sept. 1-30, determined by use of discharge integrator; Aug. 21-31, by applying to rating table, one daily reading of gage.

Monthly discharge of Link River at Klamath Falls, Oreg., for the year ending Sept. 30, 1915.

Month.	Discharge in second-feet.			Run-off (total in acre-feet).	Accuracy.
	Maximum.	Minimum.	Mean.		
October	1,610	1,000	1,370	84,200	A.
November	1,770	1,350	1,680	100,000	A.
December	1,940	1,660	1,860	114,000	A.
January	2,000	1,860	1,930	119,000	A.
February	2,210	1,940	2,020	112,000	A.
March	2,660	2,070	2,280	140,000	A.
April	3,350	2,660	2,980	177,000	A.
May	2,880	2,140	2,410	148,000	B.
June	2,280	1,220	1,720	102,000	B.
July	1,280	795	1,090	67,000	A.
August	1,000	802	904	55,600	B.
September	1,100	810	901	53,600	B.
The year	3,350	795	1,760	1,270,000	

Total monthly discharge of Link River at Klamath Falls, Oreg., including "A" canal for the year ending Sept. 30, 1915.

Month.	Discharge in second-feet.			Run-off (total in acre-feet).	Accuracy.
	Maximum.	Minimum.	Mean.		
October	1,610	1,000	1,370	84,200	A.
November	1,770	1,350	1,680	100,000	A.
December	1,940	1,660	1,860	114,000	A.
January	2,000	1,860	1,930	119,000	A.
February	2,210	1,940	2,020	112,000	A.
March	2,660	2,070	2,280	140,000	A.
April	3,420	2,660	3,000	179,000	A.
May	2,970	2,300	2,510	154,000	B.
June	2,620	1,510	2,030	121,000	B.
July	1,490	1,120	1,280	78,700	A.
August	1,160	913	1,050	64,600	B.
September	1,150	860	955	56,800	B.
The year	3,420	860	1,830	1,320,000	

KLAMATH RIVER AT SPENCER BRIDGE, NEAR KENO, OREG.

Location.—In sec. 32, T. 39 S., R. 7 E., at highway bridge, about a mile below Spencer Creek, 6 miles below former station at Keno, and 18 miles west of Klamath Falls, Klamath County, on road to Ashland.

Drainage area.—Not measured.

Records available.—October 7, 1913, to September 30, 1915. Records at Keno, May 31, 1904, to December 31, 1913, gave results smaller by the small flow contributed by Spencer Creek.

Gage.—Vertical staff near upstream end of first concrete pier at east end of bridge; read 6 times a week until June 30, 1914, and 3 times a week thereafter. Gage readers, Mattie E. Foster and Bertha Spencer.

Discharge measurements.—Made from upstream side of wagon bridge or by wading at low water. The bridge is supported by bents 20 feet apart, center to center, resting on concrete footings about 2 feet wide and extending above high-water stage. The upstream end of these piers is immediately under the upstream handrail. The meter has generally been suspended from the upstream projection of certain floor beams where velocities have not been influenced by the piers. Measurements by wading have been made just above the bridge.

Channel and control.—Heavy gravel and boulders; practically permanent; bed very even.

Extremes of discharge.—Maximum stage recorded during 1914, 2.42 feet April 21 (discharge, 5,130 second-feet); minimum stage recorded, 0.03 foot September 12 (discharge, 963 second-feet). Maximum stage recorded during 1915, 1.42 feet April 15 (discharge, 3,110 second-feet); minimum stage recorded, −0.10 foot August 10, 21, 26, September 2, 7, 9, 11, and 14 (discharge, 830 second-feet).

1904–1915: Maximum stage recorded at Keno, 15.3 feet about May 10, 1904, from high-water marks observed May 31 (discharge, 9,250 second-feet); minimum stage at Keno, 11.5 feet October 2, 1908 (discharge, 730 second-feet). Stage-discharge relation varied considerably at the Keno station. The lowest discharge obtained as the result of a current-meter measurement was 680 second-feet (stage, 12.0 feet) November 3, 1905.

Winter flow.—Stage-discharge relation not affected by ice.

Diversions.—Only a small quantity of water diverted below Klamath Falls station. At times water finds its way into Lower Klamath Lake through Klamath Straits; at other times the flow is into the river. Much of the winter flow of Lost River is diverted into Klamath River between Klamath Falls and Keno stations. (See p. 309.)

Regulation.—Some natural regulation is caused by effect of wind on the wide flat stretches of the river above Keno.

Accuracy.—Results only fair on account of lack of daily readings, diurnal fluctuations, and lack of measurements at highest stages in 1914.

Cooperation.—Field data furnished by United States Reclamation Service, J. G. Camp, project engineer, Klamath project.

Discharge measurements of Klamath River at Spencer Bridge near Keno, Oreg., during the period Sept. 3, 1913, to Sept. 30, 1915.

Date.	Made by—	Gage height.	Discharge.	Date.	Made by—	Gage height.	Discharge.
1913.		*Feet.*	*Sec.-ft.*			*Feet.*	*Sec.-ft.*
Sept. 3	Leland Mosier	0.60	1,700	Nov. 7[b]	Henshaw & Mosier	0.69	1,810
Oct. 6	do	.40	1,470				
24	do	.45	1,540	1915.			
				Apr. 12	Humphrey & Hughes	1.32	2,940
1914.				June 17	C. P. Hughes	.72	1 940
Aug. 31[a]	C. E. Maxwell	.11	889	July 31	do	.00	869
Sept. 1[a]	do	.14	862	Sept. 8[b]	H. W. Humphrey	−.10	823
23[a]	do	.11	888	8	A. R. Leavitt	−.10	834

[a] Measurements improperly made and results uncertain.

[b] Measured by wading just above bridge.

Daily discharge, in second-feet, of Klamath River at Spencer Bridge, near Keno, Oreg., for the years ending Sept. 30, 1914 and 1915.

Day.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.
1913–14.												
1	......	1,560	1,840	2,420	3,390	3,410	4,330	5,000	3,910	......	1,480	1,140
2	......	1,560	1,890	2,570	3,290	3,390	4,330	4,920	3,890	2,850	......	......
3	......	1,610	1,860	2,640	3,410	3,430	4,410	4,830	3,770	......	......	1,100
4	......	1,560	1,860	2,710	3,290	3,430	4,490	4,870	3,570	2,980	1,410	......
5	......	1,560	1,870	2,890	3,200	3,450	4,570	4,800	3,610	......	......	1,180
6	1,410	1,660	1,870	2,780	3,250	3,490	4,530	4,690	3,610	......	1,340	......
7	1,440	1,690	1,870	2,780	3,220	3,540	4,530	4,590	3,620	2,710	......	......
8	1,440	1,680	1,870	2,820	3,200	3,590	4,590	4,610	3,630	......	1,340	1,040
9	1,490	1,660	1,870	2,760	3,210	3,610	4,570	4,650	3,630	2,640	......	......
10	1,440	1,700	1,890	2,780	3,210	3,630	4,570	4,690	3,580	......	......	1,010
11	1.440	1,660	1,890	2,800	3,200	3,710	4,630	4,780	3,530	2,490	1,310	......
12	1,460	1,660	1,950	2,760	3,200	3,770	4,690	4,290	3,490	......	......	963
13	1,470	1,760	1,920	2,710	3,180	3,830	4,630	4,390	3,450	......	1,280	......
14	1,450	1,700	1,890	2,760	3,180	3,890	4,720	4,330	3,450	2,350	......	......
15	1,440	1,700	1,900	2,750	3,180	3,950	4,650	4,490	3,450	......	1,260	1,090
16	1,440	1,690	1,890	2,750	3,180	3,970	4,890	4,420	3,450	2,260	......	......
17	1,440	1,760	1,860	2,750	3,180	3,950	4,870	4,350	3,430	......	......	1,110
18	1,440	1,760	1,890	2,750	3,250	4,010	4,770	4,210	3,410	2,050	1,200	......
19	1,440	1,740	1,950	2,850	3,270	4,110	4,690	4,290	3,320	......	......	1,140
20	1,440	1,750	1,940	2,940	3,270.	4,150	4,910	4,250	3,230	......	1,140	......
21	1,440	1,720	1,990	2,940	3,270	4,190	5,130	4,250	3,180	2,080	......	......
22	1,480	1,760	1,970	3,000	3,270	4,230	5,090	4,210	3,120	......	1,160	......
23	1,490	1,810	2,000	3,070	3,270	4,250	5,050	4,180	3,070	1,900	......	1,140
24	1,480	1,820	2,000	3,020	3,270	4,210	5,050	4,150	3,040	......	......	......
25	1,480	1,840	2,020	2,980	3,270	4,210	5,000	4,190	3,000	1,690	1,160	1,160
26	1,490	1,860	1,970	3,410	3,330	4,390	4,960	4,190	2,960	......	......	1,160
27	1,480	1,810	2,020	3,410	3,270	4,350	4,940	3,970	2,930	......	1,110	......
28	1,520	1,810	2,050	3,330	3,340	4,320	5,000	4,090	2,920	1,760	......	......
29	1,520	1,840	2,020	3,370	......	4,290	5,000	4,010	2,900	......	1,110	1,170
30	1,520	1,860	2,120	3,390	......	4,370	5,060	3,980	2,890	1,550	......	......
31	1,550	......	2,530	3,340	......	4,310	......	3,950	......	......	......	......
1914–15.												
1	1,180	......	1,700	......	......	......	2,910	3,000	2,350	1,580	......	......
2	......	......	......	1,960	2,390	2,240	......	......	......	......	......	830
3	1,210	1,700	1,760	......	......	......	3,050	......	2,350	1,550	974	......
4	......	......	......	......	2,080	2,190	......	2,780	......	......	......	......
5	......	1,690	1,800	1,970	......	......	......	......	2,310	......	941	......
6	1,290	......	......	......	2,000	2,280	3,070	2,710	......	1,450	......	......
7	......	1,840	......	2,000	......	......	......	......	......	......	980	830
8	1,310	......	1,720	......	......	......	3,080	2,570	2,170	1,480	......	......
9	......	......	......	2,020	1,980	2,300	......	......	......	......	......	830
10	1,410	1,840	1,940	......	......	......	3,080	......	1,900	1,450	880	......
11	......	......	......	......	1,980	2,310	......	2,710	......	......	......	830
12	......	1,760	......	2,060	......	......	2,930	......	......	......	840	......
13	1,580	......	......	......	1,980	......	3,070	2,660	......	1,330	......	......
14	......	1,840	......	2,150	......	......	......	......	......	......	......	830
15	......	......	......	......	......	......	3,110	2,620	2,000	1,340	......	......
16	......	......	2,120	2,120	2,000	2,300	......	......	......	......	......	850
17	1,380	1,840	2,170	......	......	......	3,000	......	1,860	1,280	930	......
18	......	......	......	......	......	2,530	......	2,420	......	......	......	......
19	......	......	2,210	2,150	......	......	......	......	1,810	......	840	......
20	1,630	......	......	......	2,020	2,530	2,820	2,460	......	1,280	......	......
21	......	1,840	......	2,140	......	......	......	......	......	......	830	850
22	1,690	......	2,170	......	......	......	2,910	2,460	1,810	1,180	......	......
23	......	......	......	2,100	2,100	2,530	......	......	......	......	980	1,030
24	1,720	1,840	2,080	......	......	......	2,820	......	1,680	1,100	......	......
25	......	......	......	......	2,100	2,670	......	2,590	......	......	......	1,080
26	......	1,840	2,080	2,070	......	......	......	......	1,680	......	830	......
27	1,720	......	......	......	2,120	2,750	2,820	2,280	......	1,000	......	......
28	......	......	......	2,100	......	......	......	......	......	......	980	952
29	1,690	......	2,120	......	......	......	2,960	2,440	......	......	......	......
30	......	......	......	2,100	......	......	......	......	......	......	......	1,000
31	1,690	......	1,960	......	......	2,820	......	......	......	1,040	980	......

NOTE.—Discharge determined from a well-defined rating curve. Discharge interpolated Sundays from Oct. 6, 1913, to June 5, 1914, and June 6–8, 10, 12, 14–15, 17, 19, 21–22, 24, 26, 28–29, 1914. After July 1, 1914, discharge has been computed only for days on which gage was read. Mean discharge Oct. 1–5, 1913, estimated at 1,450 second-feet.

Monthly discharge of Klamath River at Spencer Bridge, near Keno, Oreg., for the years ending Sept. 30, 1914 and 1915.

Month.	Discharge in second-feet.			Run-off (total in acre-feet).	Accuracy.
	Maximum.	Minimum.	Mean.		
1913-14.					
October	1,550	1,410	1,460	89,800	B.
November	1,860	1,560	1,720	102,000	B.
December	2,530	1,840	1,950	120,000	B.
January	3,410	2,420	2,900	178,000	B.
February	3,410	3,180	3,250	180,000	B.
March	4,390	3,390	3,920	241,000	B.
April	5,130	4,330	4,750	283,000	B.
May	5,000	3,950	4,410	271,000	B.
June	3,910	2,890	3,370	201,000	B.
July	2,980	1,550	2,250	138,000	B.
August	1,480	1,110	1,250	76,900	B.
September	1,180	963	1,110	66,000	B.
The year	5,130	963	2,690	1,970,000	
1914-15.					
October	1,720	1,180	1,500	92,200	B.
November	1,840	1,690	1,800	107,000	B.
December	2,210	1,700	1,990	122,000	B.
January	2,150	1,950	2,070	127,000	B.
February	2,390	1,980	2,070	115,000	B.
March	2,820	2,190	2,450	151,000	B.
April	3,110	2,820	2,970	177,000	B.
May	3,000	2,260	2,590	159,000	B.
June	2,350	1,680	1,990	118,000	B.
July	1,580	1,000	1,310	80,600	B.
August	974	830	895	55,000	B.
September	1,030	830	897	53,400	B.
The year	3,110	830	1,900	1,360,000	

NOTE.—Monthly discharge July 1, 1914, to Sept. 30, 1915, computed by taking the mean of the daily discharge shown in table of daily discharge.

KLAMATH RIVER NEAR SEIAD VALLEY, CAL.

LOCATION.—In the NE. ¼ sec. 13, T. 46 N., R. 12 W., above highway bridge 300 feet above mouth of Walker Creek, 1¼ miles southeast of Seiad Valley, Siskiyou County, and 11½ miles below mouth of Scott River.

DRAINAGE AREA.—Not measured.

RECORDS AVAILABLE.—November 23, 1912, to September 30, 1915.

GAGE.—Staff in five sections fastened to trees on left bank one-fourth mile above highway bridge; read once a day by M. J. Brickley.

DISCHARGE MEASUREMENTS.—Made from car and cable 35 feet below gage.

CHANNEL AND CONTROL.—Gravel and boulders; fairly permanent. Both banks are high and not subject to overflow.

EXTREMES OF DISCHARGE.—Maximum stage recorded during year, 9.5 feet at 9 a. m. February 3, discharge(14,600 second-feet, determined from extension of rating curve and may be subject to error); minimum stage recorded, 3.3 feet August 29 to September 23 (discharge, 1,300 second-feet).

1913–1915: Maximum stage recorded, 13.3 feet at 9.30 p. m. December 31, 1913 (discharge, 26,500 second-feet, determined from extension of rating curve and may be subject to error); minimum stage recorded, 3.3 feet August 29 to September 23, 1915 (discharge, 1,300 second-feet).

DIVERSIONS.—Water is diverted from main river and tributaries above the station for use in irrigation, placer mining, and power developments.

REGULATION.—Effect of regulation believed to be small.

ACCURACY.—Results excellent. Rating curve is well defined except for extremely high water.

Discharge measurements of Klamath River near Seiad, Cal., during the year ending Sept. 30, 1915.

[Made by H. J. Tompkins.]

Date.	Gage height.	Discharge.
	Feet.	*Sec.-ft.*
Sept. 7	3.30	1,290
12	3.30	1,300

Daily discharge, in second-feet, of Klamath River near Seiad Valley, Cal., for the year ending Sept. 30, 1915.

Day.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.
1	1,890	3,520	2,700	3,020	5,230	4,630	7,940	7,230	6,320	3,350	1,760	1,300
2	1,890	3,520	2,700	3,020	10,800	4,630	8,440	6,770	6,320	3,350	1,760	1,300
3	2,020	3,350	2,860	3,020	14,600	4,630	8,440	6,320	6,100	3,350	1,760	1,300
4	2,020	3,020	2,860	3,020	7,940	4,440	7,940	5,660	6,100	3,350	1,760	1,300
5	2,020	2,860	2,860	3,020	5,660	4,440	8,190	5,660	6,100	3,020	1,640	1,300
6	1,890	2,860	2,860	3,090	5,030	4,440	8,440	5,230	6,100	2,700	1,640	1,300
7	1,890	2,860	2,860	3,180	5,030	4,440	7,940	5,230	6,100	2,860	1,640	1,300
8	2,150	2,860	2,860	3,520	5,030	4,440	7,460	5,440	6,100	2,860	1,520	1,300
9	2,280	2,860	2,860	3,700	9,190	4,440	6,770	5,660	5,660	3,020	1,520	1,300
10	2,280	2,860	3,020	3,520	7,230	4,440	6,540	5,660	5,660	3,020	1,520	1,300
11	2,150	2,860	3,020	3,520	5,030	4,630	6,770	5,660	5,440	2,860	1,520	1,300
12	2,150	2,860	3,020	3,520	5,030	4,630	6,770	5,660	4,830	2,860	1,520	1,300
13	2,280	2,860	3,020	3,880	4,630	4,630	6,770	5,880	4,830	2,550	1,520	1,300
14	2,280	2,860	3,020	3,880	4,440	4,630	6,540	5,880	4,830	2,550	1,410	1,300
15	2,280	2,860	3,020	3,700	4,440	5,230	6,540	5,880	4,630	2,410	1,410	1,300
16	2,410	2,860	3,020	3,520	4,250	5,230	6,540	5,880	4,630	2,410	1,410	1,300
17	2,410	2,860	3,020	3,520	4,830	5,660	6,770	6,100	4,250	2,410	1,410	1,300
18	3,020	2,860	3,020	3,520	5,230	5,660	6,770	6,100	4,250	2,410	1,410	1,300
19	3,350	2,860	3,020	3,350	5,440	5,660	6,770	6,100	4,250	2,410	1,410	1,300
20	3,350	2,860	3,020	3,350	5,230	5,660	7,000	5,660	4,250	2,280	1,410	1,300
21	3,020	2,860	3,020	3,180	5,030	6,100	7,280	5,660	4,250	2,280	1,410	1,300
22	3,020	2,860	3,020	3,180	5,030	6,770	7,230	5,440	4,250	2,280	1,410	1,300
23	2,860	2,860	3,020	3,180	4,630	6,770	6,770	5,660	3,880	2,150	1,410	1,300
24	4,630	2,700	3,020	3,180	4,630	6,540	6,770	5,660	3,700	2,150	1,410	1,410
25	4,630	2,550	3,020	3,180	4,630	6,540	6,770	5,880	3,700	2,150	1,410	1,410
26	4,630	2,550	3,020	3,350	4,630	6,540	6,770	5,880	3,520	2,020	1,410	1,410
27	4,630	2,550	3,020	3,350	4,630	6,540	6,770	5,880	3,520	1,890	1,410	1,410
28	4,440	2,550	3,020	3,520	4,630	7,000	6,770	6,100	3,180	1,890	1,410	1,410
29	4,440	2,700	3,020	3,700	....	10,800	7,000	6,320	3,180	1,890	1,300	1,410
30	4,440	2,700	3,020	3,700	....	9,190	7,700	6,320	3,350	1,760	1,300	1,410
31	3,700	....	3,020	4,250	....	7,700	....	6,320	....	1,760	1,300	....

NOTE.—Discharge determined from a rating curve well defined below 9,200 second-feet.

Monthly discharge of Klamath River near Seiad Valley, Cal., for the year ending Sept. 30, 1915.

Month.	Discharge in second-feet.			Run-off (total in acre-feet).	Accuracy.
	Maximum.	Minimum.	Mean.		
October	4,630	1,890	2,920	180,000	A.
November	3,520	2,550	2,870	171,000	A.
December	3,020	2,700	2,960	182,000	A.
January	4,250	3,020	3,410	210,000	A.
February	14,600	4,250	5,790	322,000	A.
March	10,800	4,440	5,710	351,000	A.
April	8,440	6,540	7,170	427,000	A.
May	7,230	5,230	5,900	363,000	A.
June	6,320	3,180	4,780	284,000	A.
July	3,350	1,760	2,520	155,000	A.
August	1,760	1,300	1,490	91,600	A.
September	1,410	1,300	1,330	79,100	A.
The year	14,600	1,300	3,890	2,820,000	

KLAMATH RIVER NEAR REQUA, CAL.

Location.—In sec. 29, T. 13 N., R. 2 E., at Scofield Ferry, about 9 miles above Requa, Del Norte County, and the mouth of the river, and 30 miles below mouth of Trinity River.

Drainage area.—Not measured.

Records available.—December 25, 1910, to September 30, 1915.

Gage.—Staff in four sections on right bank at ferry cable; read once a day by Willis McBeth.

Discharge measurements.—Made from car on ferry cable.

Channel and control.—Gravel; fairly permanent. Both banks are high and not subject to overflow.

Extremes of discharge.—Maximum stage recorded during year, 33.3 feet at 1 p. m. February 2 (discharge, 182,000 second-feet, determined from extension of rating curve and may be subject to error); minimum stage recorded, 5.7 feet September 22, 23, and 28 to 30 (discharge, 3,010 second-feet).

1911–1915: Maximum stage recorded, 33.3 feet at 1 p. m. February 2, 1915 (discharge, determined from extension of rating curve, 182,000 second-feet); minimum stage recorded, 5.3 feet September 23 and 24, 1911 (discharge, 2,440 second-feet).

Diversions.—Water is diverted for irrigation and power development from main river and tributaries in Oregon and California.

Regulation.—Effect of regulation believed to be small.

Accuracy.—Results excellent.

The following discharge measurement was made by Charles Leidl:

October 23, 1914: Gage height, 8.47 feet; discharge, 8,990 second-feet.

Daily discharge, in second-feet, of Klamath River near Requa, Cal., for the year ending Sept. 30, 1915.

Day.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.
1	3,380	5,420	9,100	8,200	84,100	29,000	43,300	25,800	33,100	16,000	5,580	3,340
2	3,540	6,200	8,500	9,400	182,000	23,000	42,100	24,800	32,500	15,600	5,340	3,340
3	3,720	6,760	9,100	10,000	80,100	27,400	42,700	24,400	30,700	15,200	5,120	3,340
4	3,720	6,480	11,000	12,400	59,700	23,000	42,700	23,000	29,000	15,200	4,900	3,340
5	3,720	6,200	11,400	14,000	49,200	25,800	41,500	22,600	27,900	14,400	5,120	3,340
6	3,720	5,940	12,400	20,300	43,900	24,800	40,300	22,600	28,400	13,200	4,680	3,340
7	3,540	5,420	12,800	26,800	45,700	24,400	39,100	24,400	30,100	12,400	4,480	3,480
8	3,720	4,940	14,400	45,700	47,100	24,400	44,500	31,300	29,600	12,000	4,480	3,340
9	4,100	4,940	16,800	36,100	51,300	23,900	39,100	36,100	30,100	11,700	4,280	3,220
10	5,180	5,180	14,800	29,000	45,700	23,400	46,400	38,500	30,700	11,400	4,280	3,220
11	7,040	5,180	13,600	31,300	43,900	23,400	47,100	37,300	31,900	11,400	4,280	3,340
12	6,200	5,180	11,700	34,300	37,300	23,400	43,300	36,100	32,500	10,700	4,280	3,220
13	5,180	5,420	10,000	30,700	32,500	25,400	37,900	39,100	27,900	10,700	4,100	3,220
14	5,420	5,180	9,400	40,900	28,400	27,900	35,500	29,000	24,400	10,400	4,100	3,220
15	4,500	5,940	8,800	36,100	27,400	29,000	31,900	23,400	23,000	9,720	3,940	3,220
16	4,940	5,940	8,200	27,900	30,100	30,100	29,000	28,400	22,600	9,400	3,940	3,110
17	5,940	5,420	7,900	22,600	41,500	31,300	32,500	31,300	21,200	8,800	3,940	3,110
18	10,700	5,420	8,200	20,800	39,100	32,500	36,100	38,500	21,200	8,800	3,940	3,110
19	33,700	5,420	7,900	17,600	35,500	33,100	38,500	27,900	20,800	8,500	3,780	3,110
20	22,100	5,420	7,600	16,800	33,700	33,100	36,700	31,900	19,400	8,220	3,780	3,110
21	14,400	5,180	7,320	15,200	32,500	34,300	36,100	33,700	18,500	7,940	3,780	3,110
22	10,700	5,180	7,040	14,400	33,700	37,300	34,900	34,900	18,000	7,660	3,780	3,010
23	8,800	4,940	7,320	13,200	33,700	39,100	33,700	34,300	18,000	7,660	3,620	3,010
24	10,700	4,940	7,900	12,400	33,700	40,900	31,300	34,900	16,800	7,380	3,620	3,110
25	7,320	5,180	9,400	12,000	34,300	43,300	29,600	35,500	15,600	7,380	3,620	3,110
26	7,600	4,940	10,400	11,400	27,900	43,900	29,000	33,100	14,800	6,840	3,620	3,110
27	6,480	5,180	9,100	12,000	32,500	45,100	27,900	33,700	14,000	6,320	3,620	3,110
28	5,940	7,600	8,200	16,000	31,300	51,300	27,400	34,300	14,400	6,320	3,620	3,010
29	5,680	12,000	7,900	20,300	....	58,300	25,800	35,500	14,800	6,060	3,480	3,010
30	5,420	10,700	7,600	25,800	....	57,600	26,400	34,300	14,400	5,820	3,480	3,010
31	5,420	....	7,900	27,900	....	45,700	....	33,700	....	5,820	3,480	....

Note.—Discharge determined from two rating curves well defined below 60,000 second-feet, the change in rating occurring on Feb. 2.

Monthly discharge of Klamath River near Requa, Cal., for the year ending Sept. 30, 1915.

Month.	Discharge in second-feet.			Run-off (total in acre-feet).	Accuracy.
	Maximum.	Minimum.	Mean.		
October	33,700	3,380	7,500	461,000	A.
November	12,000	4,940	5,930	353,000	A.
December	16,800	7,040	9,800	603,000	A.
January	45,700	8,200	21,700	1,330,000	A.
February	182,000	27,400	46,400	2,580,000	B.
March	58,300	23,000	33,400	2,050,000	A.
April	47,100	25,800	36,400	2,170,000	A.
May	39,100	22,600	31,400	1,930,000	A.
June	33,100	14,000	23,500	1,400,000	A.
July	16,000	5,820	9,970	613,000	A.
August	5,580	3,480	4,130	254,000	A.
September	3,480	3,010	3,190	190,000	A.
The year	182,000	3,010	19,200	13,900,000	

SPRAGUE RIVER NEAR YAINAX, OREG.

Location.—In the NW. ¼ sec. 20,[1] T. 36 S., R. 13 E., about 2 miles above the highway bridge on the road from Yainax to Silver Lake, about 4 miles above mouth of Sycan River, and about 10 miles east of Yainax, Klamath County.

Drainage area.—513 square miles.

Records available.—April 19, 1912, to September 30, 1915.

Gage.—Stevens water-stage recorder on left bank, installed February 20, 1914, at site of vertical staff gage which was read about once a week prior to that date. Observers, engineers of United States Indian Service.

Channel and control.—Sand and gravel; no well-defined control, as stream is very sluggish for miles above and below gage; banks subject to overflow at a stage of about 5 feet and considerable water may flow in a cut-off across a bend to the right of the station.

Extremes of discharge.—Maximum stage during year from water-stage recorder, 3.06 feet about 2 p. m., March 30 (discharge, 416 second-feet); minimum stage from water-stage recorder, 0.67 foot August 23 (discharge, 106 second-feet).

1912–1915: Maximum stage recorded, 5.41 feet April 17, 1914 (discharge, 961 second-feet). There was recorded at a station 2 miles downstream, on May 21, 1904, a discharge of 2,080 second-feet). Minimum stage recorded, 0.67 foot August 23, 1915 (discharge, 106 second-feet).

Winter flow.—Stage-discharge relation seldom affected by ice as stream is spring fed.

Diversions.—Considerable water is diverted near Bly for irrigation.

Regulation.—None.

Accuracy.—Results good since water-stage recorder was installed; fair previous to that time.

Cooperation.—Field data furnished by United States Indian Irrigation Service, H. W. Hincks, project engineer.

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[1] Sectional location as published in Water-Supply Paper 331, p. 379, is in error.

Discharge measurements of Sprague River near Yainax, Oreg., during the year ending Sept. 30, 1915.

Date.	Made by—	Gage height.	Discharge.	Date.	Made by—	Gage height.	Discharge.
		Feet.	*Sec.-ft.*			*Feet.*	*Sec.-ft.*
Nov. 3	Henshaw and Hincks..	1.12	153	Apr. 14	N. Bostwick...........	2.55	326
Jan. 23	Bostwick and Cunningham.............	.85	132	July 7	Hincks and Cunningham..................	1.05	142
Feb. 24	Pearson and Cunningham.................	1.43	203	Aug. 4	J. J. Hubbell...........	1.00	139
				31[a]	.....do...................	.70	108

[a] Stage-discharge relation may have been slightly affected by growth of weeds in channel.

Daily discharge, in second-feet, of Sprague River near Yainax, Oreg., for the year ending Sept. 30, 1915.

Day.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.
1	135	156	139	......	219	219	315	281	288	121	149	109
2	135	156	144	135	255	225	315	268	281	119	141	107
3	144	157	144	......	294	219	330	274	274	118	138	110
4	140	154	143	......	262	231	362	268	262	121	138	111
5	138	154	......	......	219	243	362	255	255	124	136	112
6	138	155	......	......	188	237	337	243	246	128	132	112
7	136	155	......	......	181	207	315	231	237	141	126	112
8	137	153	......	......	186	181	301	231	225	131	120	113
9	138	154	......	......	202	170	294	231	219	132	115	115
10	148	154	......	......	188	165	288	288	207	132	113	114
11	149	153	......	......	190	166	294	353	201	128	118	114
12	148	155	146	......	187	168	315	378	201	125	119	118
13	145	156	135	......	177	179	330	362	201	123	119	121
14	142	157	......	......	167	202	330	362	197	126	117	125
15	141	151	......	......	164	219	322	362	194	129	118	125
16	140	150	......	......	174	243	330	337	188	129	119	123
17	142	151	......	......	207	262	337	330	181	130	112	120
18	153	144	......	......	262	262	353	330	173	131	112	119
19	164	142	......	......	322	274	370	337	169	132	111	118
20	187	140	......	......	294	268	387	330	162	134	110	118
21	170	139	......	......	237	262	387	315	160	134	109	118
22	163	140	......	126	202	268	387	308	152	136	107	117
23	160	142	......	131	193	288	370	301	148	137	107	117
24	158	142	......	130	188	301	345	322	138	139	109	116
25	158	141	......	142	196	337	330	345	139	139	110	116
26	157	142	......	147	202	362	315	345	140	138	109	115
27	155	145	......	146	207	330	301	337	139	136	109	115
28	155	147	......	151	213	322	288	322	135	136	108	114
29	154	144	......	164	......	337	288	315	127	139	108	114
30	153	138	......	168	......	405	288	301	123	142	109	113
31	157	......	......	179	......	362	......	294	......	150	108	......

NOTE.—Discharge determined from rating curves applicable as follows: Oct. 1-19, fairly well defined; Oct. 20 to Mar. 30, fairly well defined; Mar. 31 to Sept. 30, well defined except for September. Discharge, Sept. 21-29, interpolated.

Monthly discharge of Sprague River near Yainax, Oreg., for the year ending Sept. 30, 1915.

Month.	Discharge in second-feet.			Run-off (total in acre-feet).	Accuracy.
	Maximum.	Minimum.	Mean.		
October	187	135	150	9,220	B.
November	157	138	149	8,870	A.
December			[a]140	8,610	C.
January			[a]140	8,610	C.
February	322	164	213	11,800	B.
March	405	165	255	15,700	B.
April	387	288	330	19,600	B,
May	378	231	308	18,900	B.
June	288	123	192	11,400	A.
July	150	118	132	8,120	A.
August	149	107	118	7,260	A.
September	125	107	116	6,900	A.
The year	405	107	187	135,000	

[a] Estimated.

SPRAGUE RIVER AT CHILOQIUN, OREG.

Location.—In the NE. ¼ sec. 3, T. 35 S., R. 7 E., at wagon bridge one-half mile above mouth and the same distance above the Southern Pacific Railroad bridge, where the station was located up to October 31, 1914, half a mile below diversion dam of Modoc Point Canal of United States Indian Office, and about three-fourths mile south of Chiloquin, Klamath County.

Drainage area.—1,550 square miles.

Records available.—July 25, 1911, to September 30, 1915.

Gage.—Vertical staff on downstream end of first bridge pier from right bank; read once daily by employees of United States Indian Service. Chain gage on the railroad bridge was used up to October 31, 1914.

Discharge measurements.—Made from upstream side of wagon bridge. Previous to October 31, 1914, they were made from Southern Pacific Co.'s railroad bridge.

Channel and control.—Channel of gravel and boulders; control of large rocks; may shift slightly. There may be slight effect from growth of aquatic plants at low water.

Extremes of discharge.—Maximum stage recorded during year, 1.95 feet March 27 (discharge, 1,060 second-feet); minimum stage, 0.22 foot August 11 to 14 (discharge, 236 second-feet); minimum discharge including Modoc Point Canal, 293 second-feet, September 1 to 5.

1911–1915: Maximum stage recorded, 4.0 feet on gage at railroad bridge April 16, 1913 (discharge, 3,350 second-feet); minimum discharge (including Modoc Point Canal), 293 second-feet September 1 to 5, 1915.

Winter flow.—Stage-discharge relation affected by ice only during short periods of extremely cold weather.

Diversions.—The Modoc Point Canal, completed in 1915, diverted some water around the gage, of which a record was kept. A considerable quantity of water is also diverted for irrigation in the headwaters of Sprague and Sycan rivers.

Regulation.—Manipulation of sluiceway of diversion dam may cause some fluctuation at the gage.

Accuracy.—Results good.

Cooperation.—Field data furnished by United States Indian Irrigation Service, H. W. Hincks, project engineer.

Discharge measurements of Sprague River at Chiloquin, Oreg., during the year ending Sept. 30, 1915.

Date.	Made by—	Gage height.	Discharge.	Date.	Made by—	Gage height.	Discharge.
		Feet.	*Sec.-ft.*			*Feet.*	*Sec.-ft.*
Oct. 28	Henshaw and Hincks	0.73	409	June 26	F. F. Henshaw	0.46	289
28	.....do	.95	522	30	.....do	.57	338
29	Henshaw & Bostwick	.23	238	30	N. Bostwick	.59	340
29	F. F. Henshaw	.66	385	July 1	.....do	.25	259
Feb. 3	N. Bostwick	1.08	537	1	.....do	.33	273
Apr. 6	Bostwick and Bullard	1.85	983				

Daily discharge, in second-feet, of Sprague River at Chiloquin, Oreg., for the year ending Sept. 30, 1915.

Day.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.
1	378	400	a 422	a 422	460	525	960	a 710	650	248	a 268	250
2	378	400	422	422	500	550	970	700	600	a 248	272	250
3	378	400	380	a 411	550	550	980	675	600	a 248	258	250
4	405	422	422	400	600	550	985	650	550	a 249	256	250
5	405	400	422	422	600	550	960	650	500	a 249	252	250
6	405	400	422	422	575	525	930	650	500	a 250	252	252
7	405	a 400	400	422	500	575	905	625	460	250	252	252
8	405	400	400	422	480	550	880	650	a 453	262	a 251	a 252
9	378	400	400	400	460	500	850	625	a 447	258	250	252
10	378	400	400	400	480	500	790	a 616	440	256	243	252
11	378	400	400	400	500	480	730	a 608	420	256	236	252
12	378	400	400	400	480	490	675	600	420	254	236	a 257
13	378	400	a 400	422	460	500	700	600	420	254	236	262
14	378	422	a 400	400	460	550	a 730	a 638	362	254	226	a 263
15	378	422	400	400	440	575	a 760	675	345	252	a 244	264
16	378	422	400	400	440	600	790	700	a 340	246	252	266
17	378	422	380	400	420	600	790	a 730	a 334	242	250	266
18	405	a 422	400	400	460	a 680	760	760	328	a 242	275	266
19	435	422	422	400	500	760	760	700	345	242	268	264
20	405	400	a 446	400	575	730	760	675	a 340	240	264	264
21	405	400	470	400	625	790	730	675	a 334	240	264	264
22	405	400	422	378	625	915	a 775	700	328	240	a 263	306
23	405	400	400	378	575	985	820	650	310	258	a 261	304
24	405	400	422	a 400	550	a 1,000	820	625	a 310	256	260	303
25	378	a 400	a 422	422	500	a 1,020	a 835	650	310	a 256	254	302
26	350	400	422	420	525	a 1,040	850	625	295	256	254	301
27	405	400	a 434	440	600	1,060	820	a 638	295	256	258	293
28	405	a 411	445	440	525	950	a 775	650	310	266	266	298
29	405	422	422	400	....	a 950	730	650	328	256	a 256	a 298
30	405	422	422	420	....	a 950	a 720	a 650	328	a 260	256	298
31	378	....	422	440	....	950	....	a 650	....	264	252	....

a Interpolated.

NOTE.—Discharge determined as follows: Oct. 1–31, from gage readings at railroad bridge, by indirect method for shifting channels; Nov. 1 to Jan. 15, from a well-defined rating curve; Jan. 16–21, estimated on account of ice obstruction; Jan. 26 to Sept. 30, from a rating curve well defined above 300 second-feet and fairly well defined below. Discharge estimated Apr. 1–3, 5–8, 10, 11, June 3, Sept. 5, 6, 17–20, and 22–26.

Monthly discharge of Sprague River at Chiloquin, Oreg., for the year ending Sept. 30, 1915.

Month.	Discharge in second-feet.			Run-off (total in acre-feet).	Accuracy.
	Maximum.	Minimum.	Mean.		
October	435	350	392	24,100	B.
November	422	400	407	24,200	A.
December	445	380	414	25,500	A.
January	440	378	410	25,200	B.
February	625	420	517	28,600	A.
March	1,060	480	708	43,500	A.
April	985	675	818	48,700	A.
May	760	600	658	40,400	A.
June	650	295	400	23,800	A.
July	264	240	251	15,400	B.
August	275	236	254	15,600	B.
September	306	250	270	16,100	B.
The year	1,060	236	458	331,000	

Total monthly discharge of Sprague River at Chiloquin, Oreg., including Modoc Point canal, for the year ending Sept. 30, 1915.

Month.	Discharge in second-feet.			Run-off (total in acre-feet).	Accuracy.
	Maximum.	Minimum.	Mean.		
October	435	350	392	24,100	B.
November	422	400	407	24,200	A.
December	445	380	414	25,500	A.
January	440	378	410	25,200	B.
February	625	420	517	28,600	A.
March	1,060	485	713	43,800	A.
April	1,000	690	833	49,600	B.
May	785	625	690	42,400	B.
June	650	327	439	26,100	A.
July	352	316	332	20,400	B.
August	344	295	317	19,500	B.
September	309	293	301	17,900	B.
The year	1,060	293	480	347,000	

SYCAN RIVER NEAR YAINAX, OREG.

Location.—In the NW. ¼ sec. 28, T. 35 S., R. 12 E., about 5 miles by stream above mouth, and about 16 miles northeast of Yainax, Klamath County.

Drainage area.—Not measured.

Records available.—November 25, 1911, to September 30, 1915.

Gage.—Stevens water-stage recorder on left bank. Observers, engineers United States Indian Service. Vertical staff in sec. 3, T. 36 S., R. 12 E., about 3 miles below present gage, was used 1911 to 1913.

Discharge measurements.—Made from cable 15 feet above gage, or by wading.

Channel and control.—Stream bed, gravel and sand; heavy growth of aquatic plants in summer; shifting. One channel at all stages; banks not subject to overflow.

Extremes of discharge.—Maximum stage during year from water-stage recorder, 4.89 feet at 12 m. March 21 (discharge, 564 second-feet); minimum stage from water-stage recorder, 0.71 foot September 30 (discharge, 20 second-feet).

1911–1915: Maximum stage recorded, 10.1 feet (old gage) April 13, 1913 (discharge, 1,680 second-feet). River may have reached a higher stage than this, as the gage was destroyed. The minimum discharge for 1915 was probably as low as has been reached for several years. The earlier low-water gage heights are not believed to be wholly reliable.

Winter flow.—Stage discharge relation apparently not seriously affected by ice, as most of low-water flow comes from springs.

Diversions.—Some water is used for irrigation by flooding in Sycan Marsh.

Regulation.—None.

Accuracy.—Results good since recorder has been installed.

Cooperation.—Field data furnished by United States Indian Irrigation Service.

Discharge measurements of Sycan River near Yainax, Oreg., during the year ending Sept. 30, 1915.

Date.	Made by—	Gage height.	Discharge	Date.	Made by—	Gage height.	Discharge.
		Feet.	*Sec.-ft.*			*Feet.*	*Sec.-ft.*
Nov. 3	Henshaw and Hincks	0.99	48.6	Aug. 3	J. J. Hubbell	1.15	26.7
Jan. 23	Bostwick and Cunningham	.60	23.9	19	do	1.05	24.4
Feb. 26	Bostwick and Pearson	.86	58.3	Sept. 1	do	1.00	19.7
Apr. 14	N. Bostwick	3.05	254	23	do	.85	23.0
July 7	Hincks and Cunningham	1.43	38.7				

Daily discharge, in second-feet, of Sycan River near Yainax, Oreg., for the year ending Sept. 30, 1915.

Day.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	June.	July.	Aug.	Sept.
1	49	52	40	25	37	57	271		35	26	21
2	49	52	39	25	38	64	257		34	27	21
3	48	50	37	25	37	68	285		33	28	22
4	48	51	37	25	35	67	374		35		24
5	48	51	36	25	34	64	328		36		24
6	48	51	35	25	34	64	257		37		24
7	49	51	37	25	36	64	229		38		24
8	50	50	36	25	37	62	229		40		26
9	52	50	36	25	37	64	208		40		27
10	53	50	36	25	37	65	180				27
11	52	49	35	25	37	65	167				26
12	55	48	34	25	36	68	167				26
13	55	48	31	25	39	74	190				27
14	55	48	30	25	38	83	250				28
15	52	42	31	25	37	106	229				28
16	52	48	34	25	37	154					26
17	55	49	35	25	43	236					27
18	63	49	30	25	57	328					27
19	65	42	28	26	55	454				24	26
20	67	42	28	26	49	509				25	24
21	64	42	34	26	46	472			30	24	23
22	64	42	27	27	44	454			30	24	24
23	62	43	26	27	44	436			29	24	23
24	58	40	26	27	56	436			28	23	22
25	56	39	26	26	61	400			27	23	22
26	55	41	25	28	62	320			26	23	23
27	53	47	25	28	57	271			26	22	23
28	52	47	24	29	59	278			26	22	22
29	52	40	25	30		358			26	21	22
30	53	38	24	30		271		35	26	21	21
31	52		25	30		250			26	20	

Note.—Discharge determined as follows: Oct. 1 to Jan. 25, from fairly well-defined rating curve; Jan. 26 to Feb. 23, by indirect method for shifting control; Feb. 24 to Apr. 15, from fairly well-defined rating curve; June 30 to Aug. 20, from well defined rating curve. Aug. 21 to Sept. 30, by indirect method for shifting control, on account of obstruction from aquatic plants. Discharge, Oct. 1, and July 27 to Aug. 2, estimated, and interpolated Oct. 28, Jan. 17-20, July 5. 6, 24, 25. Discharge, July 10-20, estimated 35 second-feet, and Aug. 4-18, 26 second-feet.

Monthly discharge of Sycan River near Yainax, Oreg., for the year ending Sept. 30, 1915.

Month.	Discharge in second-feet.			Run-off (total in acre-feet).	Accuracy.
	Maximum.	Minimum.	Mean.		
October	67	48	54.4	3,340	B.
November	52	38	46.4	2,760	B.
December	40	24	31.4	1,930	B.
January	30	25	26.1	1,600	C.
February	62	34	43.5	2,420	C.
March	509	57	215	13,200	B.
April 1-15	374	167	241	7,170	B.
July	40	26	32.7	2,010	B.
August	28	20	24.7	1,520	B
September	28	21	24.3	1,450	C.

MODOC POINT CANAL NEAR CHILOQUIN, OREG.

Location.—In the SE. ¼ sec. 3, T. 35 S., R. 7 E., at intake about a mile south of Chiloquin, Klamath County.

Drainage area.—Not measured.

Records available.—June 14 to September 30, 1915.

Gage.—Inclined staff painted on left of concrete-lined section, about 100 feet below head gates; installed June 29, 1915; previous to that date readings had been made on gage at bridge one-half mile below.

Discharge measurement.—Made by wading.

Channel and control.—Earth section of canal begins immediately below gage; bottom width, 10 feet; grade, 2.64 feet per mile. Operation of controlling wasteway about a mile below apparently does not affect stage-discharge relation at intake, but did have a material effect at the gage on the bridge.

Extremes of discharge.—Maximum stage recorded during period, 2.90 feet July 10 (discharge, 93 second-feet); no flow at times.

Accuracy.—Results excellent after regular gage was installed.

Cooperation.—Field data furnished by United States Indian Irrigation Service, H. W. Hincks, project engineer.

Discharge measurements of Modoc Point canal near Chiloquin, Oreg., during the year ending Sept. 30, 1915.

Date.	Made by—	Gage height.	Discharge.	Date.	Made by—	Gage height.	Discharge.
		Feet.	*Sec.-ft.*			*Feet.*	*Sec.-ft.*
June 26	F. F. Henshaw	[a] 2.00	53.4	June 30	N. Bostwick	2.23	49.0
27	.....do	[b] 1.70	53.8	30	.....do	1.92	34.8
30	N. Bostwick	.87	60.4	30	.....do	2.49	65.0
30	.....do	1.30	15.8	Aug. 5	Bostwick and Sargent	2.75	82.1

[a] Reading on gage at bridge, height at regular gage, 2.26 feet.

[b] Reading of gage at bridge.

Daily discharge, in second-feet, of Modoc Point canal near Chiloquin, Oreg., for the year ending Sept. 30, 1915.

Day.	June.	July.	Aug.	Sept.	Day.	June.	July.	Aug.	Sept.
1	0	90	60	43	16	47	90	82	43
2	0	90	60	43	17	47	90	82	43
3	0	90	86	43	18	47	90	43	43
4	....	90	86	43	19	44	90	43	43
5	....	90	86	43	20	47	90	43	43
6	....	90	84	43	21	50	90	43	43
7	....	90	82	43	22	53	90	43	0
8	....	90	82	43	23	53	60	43	0
9	....	90	82	43	24	53	60	43	0
10	....	93	82	43	25	53	60	43	0
11	....	90	82	43	26	53	60	43	0
12	....	90	82	43	27	54	60	43	7
13	0	90	82	43	28	17	60	43	7
14	53	90	82	43	29	0	60	43	7
15	47	90	82	43	30	0	60	43	7
					31	....	60	43	....

NOTE.—Discharge July 1 to Sept. 30 determined from a well-defined rating curve applied to readings on gage near intake; June 14–28 discharge computed from readings on gage at bridge and two poorly-defined rating curves. Mean discharge May 1–23 estimated at 25 second-feet and May 24–31 and June 4–12 at 30 second-feet.

Monthly discharge of Modoc Point canal near Chiloquin, Oreg., for the year ending Sept. 30, 1915.

Month.	Discharge in second-feet.			Run-off (total in acre-feet).	Accuracy.
	Maximum.	Minimum.	Mean.		
March	....	....	[a] 5.0	307	
April	....	....	[a] 15.0	893	
May	....	....	[a] 31.5	1,940	D.
June	54	0	38.9	2,310	B.
July	93	60	81.4	5,010	A.
August	86	43	63.4	3,900	A.
September	43	0	31.0	1,840	A.
The period	....	....	....	16,200	

[a] Estimated.

WOOD RIVER AT FORT KLAMATH, OREG.

LOCATION.—In sec. 22, T. 33 S., R. 7½ E., at a highway bridge one-fourth mile east of Fort Klamath, Klamath County.

DRAINAGE AREA.—Not measured.

RECORDS AVAILABLE.—August 5, 1911, to September 30, 1915.

GAGE.—Vertical staff attached to bridge; read daily by Mrs. E. A. Page.

DISCHARGE MEASUREMENTS. Made from highway bridge.

CHANNEL AND CONTROL.—Clean gravel overlain with pumice sand, dunes of which may at times be observed moving downstream; likely to shift.

EXTREMES OF DISCHARGE.—Maximum stage recorded during year, 1.95 feet March 24–26 (discharge, 370 second-feet); minimum stage recorded, 1.35 feet August 24–31 (discharge, 230 second-feet).

1911 and 1913–1915: Maximum stage recorded, 2.50 feet July 24, 1913 (discharge, 495 second-feet, somewhat uncertain). The lowest stage on record is 0.90 foot January 21–23, 1913 (discharge not computed).

WINTER FLOW.—Stage-discharge relation unaffected by ice, as most of the water comes from copious springs a few miles above.

Diversions.—Considerable water is diverted above station for watering hay lands, mostly in May and June.

Regulation.—None.

Accuracy.—Results only fair on account of unstable channel and insufficient measurements. Discharge records have been computed for all gage readings except December 1, 1911, to March 31, 1913, during which period no measurements were made and for which ratings for other periods evidently do not apply.

Cooperation.—Gage-height records furnished by United States Reclamation Service, and part of discharge measurements by United States Indian Service.

Discharge measurements of Wood River at Fort Klamath, Oreg., during the year ending Sept. 30, 1915.

Date.	Made by—	Gage height.	Discharge.	Date.	Made by—	Gage height.	Discharge.
		Feet.	*Sec.-ft.*			*Feet.*	*Sec.-ft.*
Nov. 1	Bostwick & Henshaw..	1.89	315	June 25	F. F. Henshaw.........	1.47	256
1	.....do..................	1.90	305	July 31	N. Bostwick...........	1.67	304
Jan. 29	N. Bostwick...........	1.72	298				

Daily discharge, in second-feet, of Wood River at Fort Klamath, Oreg., for the year ending Sept. 30, 1915.

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.
1	309	333	321	357	297	285	251	309	240
2	309	345	321	357	297	274	251	309	251
3	309	345	321	357	297	274	251	297	251
4	321	321	321	345	285	262	251	297	262
5	309	321	321	333	274	251	251	297	262
6	309	321	321	333	251	251	251	285	274
7	309	321	309	321	251	251	251	274	285
8	309	321	309	321	251	262	251	274	285
9	297	321	321	321	285	262	240	274	285
10	297	321	321	309	309	262	240	274	297
11	297	321	321	309	285	262	240	262	297
12	297	321	321	309	274	251	240	262	285
13	297	321	333	309	262	251	240	251	285
14	297	321	333	309	262	251	240	251	274
15	297	309	333	309	262	251	240	251	262
16	309	321	333	321	285	251	251	240	262
17	309	321	333	333	274	251	262	240	262
18	309	321	333	321	274	251	262	240	274
19	297	321	345	321	274	251	274	240	274
20	297	321	357	321	274	251	285	240	285
21	297	321	357	321	274	251	285	240	285
22	285	321	357	321	274	251	285	240	297
23	285	321	357	321	274	251	285	240	309
24	285	321	370	321	274	251	285	230	309
25	274	321	370	321	285	251	285	230	309
26	274	321	370	321	285	262	285	230	309
27	285	321	357	309	297	262	285	230	309
28	285	321	357	309	297	262	285	230	309
29	309	....	357	297	297	262	297	230	309
30	321	....	357	297	297	251	297	230	262
31	321	....	345	....	297	....	309	230	....

Note.—Discharge determined from a fairly well defined rating curve.

Monthly discharge of Wood River at Fort Klamath, Oreg., for the year ending Sept. 30, 1915.

Month.	Discharge in second-feet.			Run-off (total in acre-feet).	Accuracy.
	Maximum.	Minimum.	Mean.		
October			[a] 290	17,800	B.
November			[a] 310	18,400	B.
December			[a] 300	18,400	B.
January	321	274	300	18,400	B.
February	345	309	323	17,900	B.
March	370	309	338	20,800	B.
April	357	297	322	19,200	B.
May	309	251	280	17,200	A.
June	285	251	257	15,300	A.
July	309	240	265	16,300	A.
August	309	230	256	15,700	A.
September	309	240	282	16,800	A.
The year	370	230	293	212,000	

[a] Estimated.

FOURMILE CREEK NEAR ODESSA, OREG.

Location.—In the NW. ¼ sec. 9, T. 36 S., R. 5 E., just below the outlet of Fourmile Lake, about 15 miles northwest of Odessa, Klamath County.

Drainage area.—Not measured.

Records available.—April 6, 1912, to September 30, 1915.

Gage.—Stevens water-stage recorder about 500 feet below outlet of lake since October 23, 1914, to replace Barrett & Lawrence recorder used since October 18, 1912. Vertical staff 10 feet below dam was used April 6 to August 8, 1912 Observer, George H. Frey.

Discharge measurements.—Made from a footbridge near gage or by wading.

Channel and control.—Heavy, angular boulders; may shift slightly.

Extremes of discharge.—Maximum stage recorded during year, 1.90 feet at 9 p. m. May 29 (discharge, 66 second-feet); no flow at times.

1912–1915: Maximum stage recorded, 2.5 feet about June 8, 1912, on old gage, estimated June 11 from high-water marks (discharge, 99 second-feet).

Winter flow.—Stage-discharge relation probably not affected by ice.

Diversions.—None.

Regulation.—None; storage dam has never been operated.

Accuracy.—Results fair.

Discharge measurements of Fourmile Creek near Odessa, Oreg., during the year ending Sept. 30, 1915.

Date.	Made by—	Gage height.	Discharge.	Date.	Made by—	Gage height.	Discharge.
		Feet.	*Sec.-ft.*			*Feet.*	*Sec.-ft.*
Oct. 23	F. F. Henshaw	1.33	3.0	June 27	R. P. Cowgill	0.92	0.[illegible]
June 10	R. P. Cowgill	1.65	20.6				

Daily discharge, in second-feet, of Fourmile Creek near Odessa, Oreg., for the year ending Sept. 30, 1915.

Day.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.
1	......	2.0	2.2	1.9	5.0	5.0	4.2	42	49	0.6	0.2	0.2
2	......	2.0	2.4	1.9	8.2	4.6	4.6	42	43	.5	.2	.2
3	......	......	2.6	2.0	8.8	3.9	6.5	38	36	.5	.2	.2
4	......	......	2.5	2.2	11	5.5	7.0	33	33	.4	.2	.2
5	......	......	2.6	2.2	10	5.5	7.6	31	31	.4	.2	.1
6	......	......	2.6	2.8	9.4	5.5	7.6	31	28	.4	.2	.1
7	......	......	2.7	2.6	8.8	5.0	8.2	30	27	.3	.2	.1
8	......	......	2.6	3.4	8.8	4.6	8.2	28	25	.3	.2	.0
9	......	......	2.5	3.9	8.8	4.2	8.8	28	24	.3	.2	......
10	......	......	2.4	3.9	8.8	4.2	8.8	33	23	.3	.2	......
11	......	......	2.4	3.7	8.2	3.9	8.8	35	23	.3	.3	......
12	......	......	2.4	5.5	7.0	3.9	10	38	22	.3	.2	......
13	......	......	2.4	7.0	6.5	4.2	12	38	20	.3	.3	......
14	......	......	2.4	8.8	6.0	4.2	14	42	19	.3	.3	......
15	......	......	2.4	8.8	5.5	3.9	14	42	16	.3	.3	......
16	......	......	2.2	8.8	4.6	3.9	14	40	13	.3	.3	......
17	......	......	2.2	8.2	4.6	4.2	16	38	12	.3	.3	......
18	......	......	2.1	7.6	4.6	4.6	18	42	10	.3	.3	......
19	......	......	2.1	6.5	4.2	4.6	22	42	8.2	.3	.3	......
20	......	......	2.1	6.0	4.6	4.2	24	40	7.6	.3	.3	......
21	......	......	2.1	5.5	5.0	4.2	27	42	7.0	.3	.3	......
22	......	......	2.0	5.5	5.0	3.9	28	38	6.0	.3	.3	......
23	2.7	2.0	1.9	5.0	5.0	3.9	30	38	5.5	.3	.3	......
24	2.5	2.0	1.9	5.0	5.0	3.9	30	40	4.2	.3	.3	......
25	2.5	2.0	1.9	3.7	5.0	3.7	30	40	3.5	.3	.3	......
26	2.3	2.0	1.8	3.5	5.0	3.5	31	40	2.2	.3	.3	......
27	2.3	1.9	2.0	3.5	5.0	3.5	33	47	.7	.3	.3	......
28	2.2	2.0	2.0	3.5	5.0	3.5	36	60	.6	.3	.3	......
29	2.2	2.3	1.9	3.5	......	3.5	42	64	.6	.3	.3	......
30	2.1	2.4	1.9	3.4	......	3.8	43	60	.6	.2	.2	......
31	1.9	......	1.9	3.5	......	4.2	......	56	......	.2	.2	......

NOTE.—Discharge determined from a fairly well defined rating curve. Discharge Oct. 1-22 and Nov. 3-22 estimated at 2.0 second-feet.

Monthly discharge of Fourmile Creek near Odessa, Oreg., for the year ending Sept. 30, 1915.

Month.	Discharge in second-feet.			Run-off (total in acre-feet).	Accuracy.
	Maximum.	Minimum.	Mean.		
October	....	....	2.09	129	C.
November	....	....	2.02	120	C.
December	2.7	1.8	2.23	137	B.
January	8.8	1.9	4.61	283	B.
February	11	4.2	6.55	364	B.
March	5.5	3.5	4.23	260	B.
April	43	4.2	18.5	1,100	B.
May	64	28	40.6	2,500	C.
June	49	.6	16.7	994	B.
July	.6	.2	.33	20	C.
August	.3	.2	.26	16	C.
September	.2	.0	.04	2	D.
The year	64	.0	8.18	5,920	

"A" CANAL AT KLAMATH FALLS, OREG.

Location.—In the NW. ¼ sec. 29, T. 38 S., R. 9 E., at the head of tunnel, about one-fourth mile below the head gates of the canal and about a mile northwest of Klamath Falls, Klamath County.

Records available.—Irrigation season, 1911 to 1915. Some water was diverted for three or four years prior to 1911, but no record was kept.

Gage.—Barrett & Lawrence water-stage recorder on right of canal just above weir.

Discharge measurements.—Made from a foot plank just inside lower end of tunnel about one-half mile below gage; rectangular section, 13.5 feet wide.

Channel and control.—Trapezoidal weir, 18.15 feet long, with its crest 7.27 feet above bottom of canal, which is a concrete-lined section 13.5 feet wide on the bottom, 12 feet deep, and with side slopes ½ to 1.

Extremes of discharge.—Maximum stage recorded during year, 3.4 feet June 25 (discharge 392 second-feet). This is probably the largest quantity of water ever diverted into the canal. No flow at certain periods.

Accuracy.—Current-meter measurements made in 1915 check the weir formula, corrected for velocity of approach, up to a depth over weir of 1.75 foot, but shows 3 per cent more water for a depth of 2 feet and 6 per cent more for a depth of 3 feet. Earlier measurements were made using too few sections and they have been discarded. Results for 1913 to 1915 excellent.

Cooperation.—Data furnished by United States Reclamation Service.

This canal diverts from Link River immediately below outlet of Upper Klamath Lake, in the NE. ¼ sec. 30, T. 38 S., R. 9 E., for irrigating lands east of Klamath River and on both sides of Lost River. Most of the return waters reach Lost River.

Discharge measurements of "A" canal at Klamath Falls, Oreg., during the year ending Sept. 30, 1915.

Date.	Made by—	Gage height.	Discharge.	Date.	Made by—	Gage height.	Discharge.
		Feet.	*Sec.-ft.*			*Feet.*	*Sec.-ft.*
Apr. 19	H. W. Humphrey......	1.05	62.2	June 2	C. P. Hughes...........	2.10	186
21	C. P. Hughes..........	1.77	141	9	.....do..................	3.05	318
29	.....do.................	1.40	106	30	.....do..................	2.80	296
May 5	.....do.................	1.25	83.0	Aug. 7	H. W. Humphrey......	1.95	169
18	.....do.................	1.44	102				

Daily discharge, in second-feet, of "A" canal at Klamath Falls, Oreg., for the year ending Sept. 30, 1915.

Day.	Oct.	Apr.	May.	June.	July.	Aug.	Sept.
1	9	....	91	165	278	232	50
2	9	....	94	187	232	262	50
3	9	....	23	217	187	262	50
4	....	....	32	262	187	262	50
5	....	....	74	262	187	202	50
6	....	....	81	217	131	202	50
7	....	....	84	247	119	172	50
8	....	....	86	278	119	144	50
9	....	....	107	326	119	144	50
10	....	....	107	342	119	131	50
11	....	....	58	326	113	131	50
12	....	....	50	342	119	172	50
13	....	....	76	342	119	202	50
14	....	....	76	358	119	138	50
15	....	....	76	350	119	138	50
16	....	....	76	358	119	138	50
17	....	....	96	358	125	131	50
18	....	....	107	342	151	131	50
19	....	62	107	358	172	131	50
20	....	50	188	358	158	131	50
21	....	50	144	342	172	131	50
22	....	50	144	342	232	147	50
23	....	50	144	310	232	129	50
24	....	50	144	310	278	119	50
25	....	50	138	392	278	111	50
26	....	52	131	366	294	111	50
27	....	62	151	294	310	111	50
28	....	62	165	270	326	86	50
29	....	76	165	278	326	81	50
30	....	96	165	294	326	76	50
31	....	....	165	....	294	58	....

NOTE.—Discharge determined from a well-defined rating curve.

Monthly discharge of "A" canal at Klamath Falls, Oreg., for the year ending Sept. 30, 1915.

Month.	Discharge in second-feet.			Run-off (total in acre-feet).	Accuracy.
	Maximum.	Minimum.	Mean.		
October	9	0	0.9	55	B.
November			0	0	
December			0	0	
January			0	0	
February			0	0	
March			0	0	
April	96	0	23.7	1,410	B.
May	165	23	106	6,520	A.
June	392	165	306	18,200	A.
July	326	113	195	12,000	A.
August	262	58	149	9,160	A.
September	50	50	50.0	2,980	B.
The year	392	0	69.6	50,300	

LOST RIVER ABOVE OLENE, OREG.

LOCATION.—In the NW. ¼ sec. 21, T. 39 S., R. 11½ E., at an old ford on Brotherton ranch, about 5 miles east of Olene, in Poe Valley. A small quantity of return water from land irrigated from the "A" canal may enter above the station.

DRAINAGE AREA.—Not measured.

RECORDS AVAILABLE.—June 22 to September 30, 1915. The discharge does not differ materially from that recorded at the station at Olene, 1907 to 1912.

Gage.—Vertical staff on right bank; read daily to hundredths by United States Reclamation Service employees.

Discharge measurements.—Made by wading; section rather poor on account of dead water at the sides.

Channel and control.—Channel tortuous; control fairly permanent; overhanging willows may affect stage-discharge relation somewhat.

Extremes of discharge.—Minimum stage recorded, 0.85 foot June 27 and 29, and July 21 (discharge, 62 second-feet). For maximum and minimum, 1904 to 1915, see "Lost River at Wilson Bridge," page 309.

Diversions.—Some land is irrigated in Yonna Valley, a few miles above the station, and a large area by flooding in Langell Valley.

Regulation.—None.

Accuracy.—Results good.

Cooperation.—Records furnished by United States Reclamation Service.

Discharge measurements of Lost River above Olene, Oreg., durning the year ending Sept. 30, 1915.

Date.	Made by—	Gage height.	Discharge.	Date.	Made by—	Gage height.	Discharge.
		Feet.	*Sec.-ft.*			*Feet.*	*Sec.-ft.*
June 21	Humphrey and Hughes	0.91	69.0	Aug. 12	A. R. Leavitt	1.10	69.8
21	C. P. Hughes	.84	62.3	24	.....do	1.11	71.4
July 9	.....do	1.04	69.9	31	.....do	1.11	69.9
24	.....do	.91	62.6				

Daily discharge, in second-feet, of Lost River above Olene, Oreg., for the year ending Sept 30, 1915.

Day.	June.	July.	Aug.	Sept.	Day.	June.	July.	Aug.	Sept.
1		65	66	74	16		71	69	74
2		65	66	75	17		72	70	74
3		65	66	75	18		73	70	74
4		66	66	74	19		73	72	74
5		66	66	74	20		62	72	73
6		70	66	74	21	63	62	74	73
7		71	68	74	22	65	65	74	73
8		71	68	74	23	65	66	74	73
9		71	66	74	24	65	64	74	73
10		71	66	73	25	66	64	74	73
11		71	67	73	26	62	66	74	73
12		72	67	74	27	62	66	77	74
13		72	70	74	28	62	66	77	73
14		71	70	73	29	62	66	74	73
15		70	69	73	30	65	66	74	73
					31		66	74	

Note.—Discharge determined from a fairly well defined rating curve.

Monthly discharge of Lost River above Olene, Oreg., for the year ending Sept. 30, 1915.

Month.	Discharge in second-feet.			Run-off (total in acre-feet).	Accuracy.
	Maximum.	Minimum.	Mean.		
June 21-30	66	62	63.7	1,260	B.
July	73	62	67.9	4,180	B.
August	77	66	70.3	4,320	B.
September	75	73	73.6	4,380	B.
The period				14,100	

LOST RIVER AT WILSON BRIDGE, NEAR OLENE, OREG.

LOCATION.—On line between secs. 29 and 30,[a] T. 39 S., R. 10 E., at Wilson Bridge, about one-fourth mile below the diversion dam, and about 4 miles by river below Olene, Klamath County.

RECORDS AVAILABLE.—March 14, 1912, to September 30, 1915.

DRAINAGE AREA.—Not measured.

GAGE.—Vertical staff attached to highway bridge; datum 4,005.18 feet above sea level and 60 feet below datum used in 1912. Gage read daily when water is flowing, by the watchman for the dam.

DISCHARGE MEASUREMENTS.—Made from highway bridge or by wading.

CHANNEL AND CONTROL.—Gravel and chalk rock, clean and fairly permanent.

EXTREMES OF DISCHARGE.—Maximum stage recorded during year, 63.4 feet March 20–22 (discharge, 522 second-feet); practically no flow except when total discharge of river exceeds capacity of diversion canal.

1904–1915: Maximum stage recorded, 18.25 feet, mean for February 7, 1907, at Merrill station (discharge, 9,200 second-feet). The maximum stage for Olene station was 13.5 feet early in 1904, determined from high-water marks by John H. Lewis, May 24, 1904 (discharge, from partly developed rating curve, 8,600 second-feet). Minimum stage recorded for natural flow conditions, 4.29 feet June 19, 1911, at Olene (discharge, 58 second-feet).

WINTER FLOW.—Stage-discharge relation not affected by ice.

DIVERSIONS.—This station is just below the dam at which practically all the discharge of Lost River up to about 500 second-feet is diverted through the diversion canal into Klamath River or into the "G" canal (formerly Griffith lateral) on the east bank of the river.

REGULATION.—Changes in discharge covering several days may be caused at times by operation of the movable crest and outlet gates of the dam.

ACCURACY.—Results good.

COOPERATION.—Field data furnished by United States Reclamation Service.

Dischargee measurements of Lost River at Wilson Bridge near Olene, Oreg., during the year ending Sept. 30, 1915.

Date.	Made by—	Gage height.	Discharge.	Date.	Made by—	Gage height.	Discharge.
		Feet.	*Sec.-ft.*			*Feet.*	*Sec.-ft.*
Nov. 5	F. F. Henshaw	60.29	86.4	Nov. 7[b]	C. E. Maxwell	61.30	200
7[a]	C. E. Maxwell	61.28	189	Apr. 1	H. W. Humphrey	61.35	235

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[a] Section location previously published is in error.

[b] Water released at dam to create stage desired for measurement.

Daily discharge, in second-feet, of Lost River at Wilson Bridge, near Olene, Oreg., for the year ending Sept. 30, 1915.

Day.	Oct.	Nov.	Dec.	Jan.	Mar.	Apr.	Day.	Oct.	Nov.	Dec.	Jan.	Mar.	Apr.
1	....	86	86	86	....	188	16	81	86	86	....	226	....
2	....	86	86	86	....	96	17	86	86	86	....	296	....
3	....	86	86	86	....	56	18	86	86	86	....	446	....
4	....	86	86	86	....	0	19	86	86	86	....	454	....
5	....	86	86	86	....	....	20	128	86	86	....	522	....
6	....	86	86	86	....	....	21	96	86	86	....	522	....
7	....	86	86	86	....	....	22	152	86	86	....	522	....
8	....	86	86	86	....	....	23	96	86	86	....	504	....
9	....	86	86	86	....	....	24	86	86	86	....	495	....
10	....	86	86	0	....	....	25	86	86	86	....	504	....
11	....	86	86	....	....	....	26	86	86	86	....	454	....
12	0	86	86	....	....	....	27	86	86	86	....	374	....
13	81	86	86	....	....	....	28	86	86	86	....	233	....
14	81	86	86	....	0	....	29	86	86	86	....	226	....
15	81	86	86	....	164	....	30	86	86	86	....	522	....
							31	106	....	86	....	382	....

NOTE.—Discharge determined from a fairly well defined rating curve.

Monthly discharge of Lost River at Wilson Bridge, near Olene, Oreg., for the year ending Sept. 30, 1915.

Month.	Discharge in second-feet.			Run-off (total in acre-feet).	Accuracy.
	Maximum.	Minimum.	Mean.		
October	152	0	56.8	3,490	B.
November	86	86	86.0	5,120	B.
December	86	86	86.0	5,290	B.
January	86	0	25.0	1,540	B.
February	0	0	0	0	
March	522	0	221	13,600	B.
April	188	0	11.3	672	B.
May	0	0	0	0	
June	0	0	0	0	
July	0	0	0	0	
August	0	0	0	0	
September	0	0	0	0	
The year	522	0	41.0	29,700	

Total daily discharge, in second-feet, of Lost River, Lost River diversion canal, and "G" canal, less the discharge of Olene wasteway, for the year ending Sept. 30, 1915.

Day.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.
1	112	86	86	86	160	246	555	126	144	94	62	100
2	112	86	86	86	160	246	476	126	140	76	98	98
3	112	86	86	86	160	254	387	150	135	70	94	95
4	112	86	86	86	160	365	331	203	159	68	86	91
5	116	86	86	86	160	369	288	147	140	65	72	93
6	121	86	86	86	160	369	288	113	118	74	80	112
7	121	86	86	86	160	369	396	122	90	67	88	120
8	121	86	86	86	166	342	360	120	132	58	75	117
9	122	86	86	115	169	342	360	111	110	44	80	102
10	123	86	86	96	169	304	321	106	107	37	76	92
11	123	86	86	86	169	304	284	100	113	44	57	83
12	123	86	86	90	166	304	261	101	116	56	56	88
13	123	86	86	41	160	304	196	87	104	82	46	88
14	81	86	86	14	166	304	195	88	88	94	60	88
15	81	86	86	89	166	563	186	87	76	103	111	89
16	81	86	86	114	166	672	223	86	61	93	121	90
17	86	86	86	114	166	742	180	107	82	74	121	90
18	86	86	86	114	166	892	180	103	80	59	123	90
19	86	86	86	115	166	900	126	73	81	120	80	89
20	128	86	86	113	160	968	151	77	97	131	66	89
21	96	86	86	107	166	952	168	88	95	131	66	89
22	152	86	86	137	166	952	126	88	96	92	77	89
23	96	86	86	172	169	934	126	84	79	78	77	88
24	86	86	86	142	172	925	168	87	104	76	84	87
25	86	86	86	137	190	934	105	103	100	99	94	84
26	86	86	86	137	199	884	168	112	90	96	97	84
27	86	86	86	137	219	804	168	114	78	91	118	83
28	86	86	86	148	209	584	168	113	94	85	119	83
29	86	86	86	148	....	595	168	139	96	92	120	83
30	86	86	86	148	....	967	168	141	95	88	114	83
31	106	....	86	148	....	700	....	143	....	81	102	....

Total monthly discharge[a] of Lost River at Wilson Bridge near Olene, Oreg., for the year ending Sept. 30, 1915.

Month.	Discharge in second-feet.			Run-off (total in acre-feet).
	Maximum.	Minimum.	Mean.	
October	152	86	104	6,400
November	86	86	86.0	5,120
December	86	86	86.0	5,290
January	172	14	108	6,640
February	219	160	170	9,440
March	967	246	593	36,500
April	555	105	243	14,500
May	203	73	111	6,820
June	159	61	103	6,130
July	131	37	81.2	4,990
August	123	46	87.7	5,390
September	120	83	91.9	5,470
The year	967	14	156	113,000

[a] Includes flow in Lost River diversion canal and "G" canal, less the discharge of Olene wasteway.

LOST RIVER DIVERSION CANAL NEAR OLENE, OREG.

Location.—In the SW. ¼ sec. 29, T. 39 S., R. 10 E., about 4 miles by river below Olene, Klamath County.

Records available.—May 1, 1912, to September 30, 1915.

Gage.—Vertical staff showing height of water in pond back of head gates and in canal below head gates; read daily or whenever gates are changed.

Gate openings.—The head works of the canal comprise three hand-operated sliding gates, each 4 feet wide and 6 feet high. The gate openings are recorded each day, and for each period of less than a day when the gates are changed. Water from Klamath River backs up the canal nearly to its head, even if no water is running.

Discharge measurements.—Made from a footbridge a short distance below the head gate.

Discharge coefficients.—The discharge coefficients for computing the flow through the gates considered as orifices have been arrived at by plotting the coefficients determined from measurements in three groups—for gate openings, 1.5 to 2.0 feet, 2.5 to 3.5 feet, and 4.0 to 5. 5 feet. The gates are generally opened an even half-foot and seldom less than 1.5 feet. The coefficient has been plotted as coordinate with head-on gates. The coefficients used vary from 0.80 to 0.93 for heads over 1.00 foot, but for low heads exceed 1.00.

Extremes of discharge.—Maximum discharge during year, 446 second-feet, March 16 to 20, for gate openings on two gates of 4.8 feet and on the third of 5.1 feet, and a head of 0.80 foot. (See footnote to table of daily discharge.) No flow at times.

1912–1915: Maximum discharge, 508 second-feet, February 28, 1914.

Accuracy.—Results good, except for heads of less than 1.0 foot with low gate openings and for heads of less than 0.5 foot with the higher gate openings. For these conditions the coefficients are not determined closely and the practice of reading the heads only to the nearest half-tenth introduces some uncertainty.

Cooperation.—Field data furnished by United States Reclamation Service.

This canal diverts water from Lost River into Klamath River to assist in lowering Tule Lake for the purpose of reclaiming the lake bed.

No current-meter measurements were made in 1915.

Daily discharge, in second-feet, of Lost River diversion canal near Olene, Oreg., for the year ending Sept. 30, 1915.

Day.	Oct.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.
1	112	....	160	246	367	126	43	....	0	64
2	112	....	160	246	380	126	41	....	17	65
3	112	....	160	254	331	126	37	....	24	65
4	112	....	160	365	331	154	64	0	18	65
5	116	....	160	369	288	87	46	5	8	66
6	121	....	160	369	288	48	23	5	18	76
7	121	....	160	369	376	54	29	10	19	75
8	121	0	166	342	360	44	70	11	18	72
9	122	29	169	342	360	29	53	15	18	67
10	123	96	169	304	321	30	42	2	13	57
11	123	86	169	304	284	32	42	3	0	49
12	123	90	166	304	261	35	42	14	0	53
13	42	41	160	304	195	34	28	37	0	53
14	0	14	166	304	195	36	0	40	22	53
15	....	89	166	399	186	37	....	41	74	53
16	....	114	166	446	223	38	....	22	70	54
17	....	114	166	446	180	58	....	2	67	54
18	....	114	166	446	180	55	....	0	64	54
19	....	115	166	446	126	49	....	23	18	53
20	....	113	160	446	151	49	....	34	0	53
21	....	107	166	430	168	53	....	35	3	53
22	....	137	166	430	126	53	....	10	12	53
23	....	172	169	430	126	40	....	0	12	53
24	....	142	172	430	168	36	....	....	32	57
25	....	137	190	430	105	44	....	....	44	58
26	....	137	199	430	168	46	....	....	54	58
27	....	137	219	430	168	47	....	....	65	58
28	....	148	209	351	168	47	....	....	67	58
29	....	148	....	369	168	47	....	....	65	58
30	....	148	....	445	168	47	....	....	64	59
31	....	148	....	318	....	47	....	....	64	....

Note.—Discharge computed from records of gate opening, head on gates, and coefficients of discharge derived from current-meter measurements.

Monthly discharge of Lost River diversion canal near Olene, Oreg., for the year ending Sept. 30, 1915.

Month.	Discharge in second-feet.				Accuracy.
	Maximum.	Minimum.	Mean.	Run-off (total in acre-feet).	
October	123	0	47.1	2,900	B.
November	0	0	0	0	
December	0	0	0	0	
January	172	0	83.1	5,110	B.
February	219	160	170	9,440	B.
March	446	246	372	22,900	B.
April	306	105	231	13,700	C.
May	154	29	56.6	3,480	B.
June	70	0	18.7	1,110	B.
July	41	0	10.0	615	B.
August	74	0	30.6	1,880	A.
September	76	49	58.9	3,500	A.
The year	446	0	89.5	64,600	

TULE LAKE NEAR MERRILL, OREG.

LOCATION.—In sec. 8, T. 41 S., R. 11 E., at J. F. Adams's ranch near the mouth of Lost River, 3 miles east of Merrill, Klamath County.

RECORDS AVAILABLE.—May 17, 1904, to September 30, 1915.

GAGE.—Vertical staff fastened to boathouse on shore of lake July 26, 1912, to May 17, 1915, when a new gage was installed about 300 feet farther upstream. Gage heights given below refer to a datum 4,000 feet above sea level; those given in Water-Supply Paper 361, page 450, refer to a datum 4,050 feet above sea level. A vertical staff on a post driven in the lake bed had been used up to July, 1912. The elevation of its zero as determined from the best available information has been as follows:

	Feet.
May 17, 1904	4,047.73
Oct. 21, 1904	4,047.76
May 11, 1907	4,048.56
June 11, 1907	4,048.56
Nov. 27, 1908	[1] 4,048.60

The gage readings made from 1904 to 1912 have been published as reported, and no attempt has been made to reduce them to a uniform datum. A graph of the gage heights has failed to reveal any critical points that would account for a sudden change. It is therefore likely that the gage was raised by the ice a little at a time during the winters of 1905–6 and 1906–7. On account of this error the gage heights prior to May, 1907, should not be used for any refined studies.

EXTREMES OF STAGE.—1904–1915: Maximum stage recorded 11.35 feet April 30 and May 1, 1907, or 4,059.91 feet above sea level. On May 17, 1905, the stage was reported by John H. Lewis to be 10.5 feet, or 4,058.23 feet above sea level. Minimum stage recorded, 4,047.98 feet, September 23, 1915.

DIVERSIONS AND REGULATION.—In June, 1909, the Clear Lake dam was closed, and water has since been released from the reservoir only for short periods. Since May 1, 1912, most of the discharge of Lost River up to about 500 second-feet has been diverted at the Lost River dam into Klamath River. Tule Lake has therefore been falling rapidly since 1909.

COOPERATION.—Since May, 1909, this station has been maintained by the United States Reclamation Service.

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[1] Referred to the original bench mark installed in 1904. According to another bench mark it was at elevation 4,048.40.

Daily gage height, in feet, of Tule Lake near Merrill, Oreg., for the years ending Sept. 30, 1914 and 1915.

Day.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.
1913-14.												
1	51.95		51.70				52.20	52.00		51.62		50.60
2				51.80	51.90	51.85			51.52			
3	51.80	51.70	51.70				52.10	51.98		51.60		50.58
4					51.90	51.90			51.79		51.08	
5		51.70	51.70	51.85								50.55
6	51.90				51.80	51.90	52.10	52.00	51.62		51.07	
7		51.70		51.90						51.60		50.45
8	51.85		51.70				52.15				51.02	
9				51.96	51.80	52.00		51.95	51.84	51.58		50.33
10	51.90	51.75	51.70				52.10				51.00	
11					51.75	52.00		51.90	51.85	51.52		50.27
12		51.70	51.70	52.00							50.96	
13	51.80				51.75	52.10	52.10	51.90	51.83	51.49		
14		51.70		52.05							50.92	
15	51.80						52.10	51.85	51.81	51.48		50.30
16				52.10	51.75	52.10						
17	51.75	51.75							51.78	51.42	50.86	50.60
18					51.80	52.05	52.10	51.88				
19		51.75		52.50					51.78		50.81	50.31
20	51.80				51.80	52.10	52.12			51.31		
21		51.75		52.00				51.85			50.82	50.29
22	51.80		51.70				52.05			51.35		
23				52.00	51.80	52.15		51.88	51.73			50.32
24	51.80	51.75	51.70				52.10				50.73	
25					51.80	52.10			51.75	51.34		
26		51.75	51.70	52.00			52.10	51.68			50.70	50.23
27	51.75				51.80	52.10			51.70	51.33		
28		51.70		52.00				51.70			50.65	
29	51.75		51.70				52.00		51.68	51.18		50.29
30				52.00				51.70				
31	51.70		51.70							51.16		
1914-15.												
1	50.28	50.22	50.20	50.15	50.24	50.22						
2								50.20	49.96			48.48
3	50.58		50.20		50.24	50.22						
4				50.15					50.06		49.06	
5	50.55	50.12	50.20		50.23	50.21	50.21	50.20				
6	50.45			50.15						49.52		
7		50.16	50.20				50.21	50.20	50.06			
8	50.33			50.15	50.23	50.22			49.96			
9			50.30				50.21				48.94	
10	50.21				50.23			50.20				48.26
11			50.30						49.96			
12	50.20			50.15	50.23	50.22	50.21					
13								50.20			48.86	
14	50.19		50.30				50.23	50.20	49.96	49.40		
15			50.30		50.28	50.23						
16	50.22	50.20		50.15			50.23		49.86			
17			50.25		50.28	50.23	50.23	50.17				48.23
18		50.22	50.25	50.15					49.86			
19	50.30						50.21					
20		50.28		50.15	50.22	50.23					48.78	
21			50.26				50.20		49.86	49.26		
22				50.15	50.22	50.22						
23		50.20	50.16				50.20					47.98
24		50.20				50.22		50.06				
25			50.15	50.15	50.23				49.86			
26		50.20				50.21	50.19	49.96				
27				50.15	50.22					49.02		48.06
28		50.20	50.15				50.19	50.06	49.66			
29				50.15		50.21						
30			50.15				50.19		49.66		48.59	
31						50.21		50.06				

MILLER CREEK NEAR LORELLA, OREG.

Location.—In sec. 7, T. 40 S., R. 14 E., at the site of an old wagon bridge, about three-fourths mile above the highway bridge, 1 mile east of the Swingle ranch in Langell Valley, and 3 miles south of Lorella, Klamath County.

Drainage area.—270 square miles.

Records available.—April 1, 1909, to September 30, 1915; August 10, 1904, to December, 1908, for a station in sec. 12, T. 39 S., R. 13 E., at the lower end of Horsefly Valley and 10 miles or more by creek above the present station; only a small amount of inflow between the two points.

Gage.—Friez water-stage recorder on left bank attached to old bridge abutment.

Discharge measurements.—Made from highway bridge, or by wading at low water; current is sluggish at the bridge, as the gradient of the stream is flat.

Channel and control.—Stream bed, rocks and gravel, overlain with some silt; control fairly permanent; left bank overflows in floods.

Extremes of discharge.—Maximum stage during year from water-stage recorder, 6.88 feet at 3 a. m. March 24 (discharge, 1,250 second-feet); minimum stage from water-stage recorder, 2.20 feet August 2 to September 7 (creek probably dry or nearly so).

1904–1915: Maximum stage recorded, 14.0 feet, February 5, 1907 (discharge 6,730 second-feet).

Winter flow.—Stage-discharge relation apparently not materially affected by ice, as control remains open. Open-channel rating curve was formerly applied throughout the winter, but no discharge records have been computed for low-water stages in 1915.

Diversions.—A small irrigating flume, carrying about 1 second-foot, diverts just above the present station, and probably a considerable area is irrigated above the station.

Regulation.—Flow may be occasionally affected by a rock and brush diversion dam just above gage.

Accuracy.—Results good for higher stages as the curve defined by measurements of 1910–11 has been confirmed by measurements in 1915–16; for low and medium stages the rating curve is very uncertain and no estimates have been attempted except for months of considerable run-off.

Cooperation.—Field data furnished by United States Reclamation Service, Klamath project.

Discharge measurements of Miller Creek near Lorella, Oreg., during the year ending Sept. 30, 1915.

Date.	Made by—	Gage height.	Discharge.
		Feet.	*Sec.-ft.*
Nov. 6	Henshaw and Mosier	2.83	0.9
May 19	C. P. Hughes	3.59	27.8

Daily discharge, in second-feet, of Miller Creek near Lorella, Oreg., for the year ending Sept. 30, 1915.

Day.	Feb.	Mar.	Apr.	May.	June.	Day.	Feb.	Mar.	Apr.	May.	June.
1	1.5	37	241	2.8	3.2	16	6	578	9	12	.4
2	2.0	33	210	.8	2.4	17	7	591	6	9	.3
3	2.3	38	228	.8	1.8	18	53	682	3.4	10	.5
4	2.0	74	228	1.0	1.4	19	94	710	2.3	16	.8
5	2.0	44	144	1.0	1.0	20	81	710	1.7	21	.5
6	2.5	31	67	2.5	.8	21	36	720	1.4	15	.5
7	3.0	18	39	2.5	.4	22	33	710	.7	13	.5
8	3.5	20	38	2.5	.3	23	15	720	.6	14	.5
9	4.0	15	36	2.5	.5	24	15	770	.5	14	.5
10	4.5	48	23	2.8	.6	25	147	540	.6	16	.5
11	5.0	81	16	4	.6	26	78	362	.6	21	.5
12	5.5	114	13	8	.8	27	57	301	1.1	15	.4
13	6	202	11	8	1.0	28	46	663	3.7	11	.4
14	6	504	13	9	1.0	29	....	574	3.2	9	.4
15	6	561	13	9	.7	30	....	311	2.8	7	.3
						31	....	285	....	5	....

NOTE.—Discharge determined from a well-defined rating curve; Feb. 6–12, Mar. 10 and 11 interpolated.

Monthly discharge of Miller Creek near Lorella, Oreg., for the year ending Sept. 30, 1915.

Month.	Discharge in second-feet.			Run-off (total in acre-feet).	Accuracy.
	Maximum.	Minimum.	Mean.		
February	147	1.5	25.8	1,430	B.
March	770	15	356	21,900	B.
April	241	.5	45.3	2,700	B.
May	21	.8	8.55	526	B.
The period				26,600	

NOTE.—Discharge October to January and June to September probably ranged from zero to about 3 second-feet on June 1, and the total run-off for these months is believed to have been 400 to 500 acre-feet.

OLENE WASTEWAY AT OLENE, OREG.

LOCATION.—In the SW. ¼ sec. 14, T. 39 S., R. 10 E., at the flume on the F canal of the Klamath project that crosses Lost River at Olene, Klamath County, about 4 miles upstream from Lost River dam.

RECORDS AVAILABLE.—June 5 to September 8,1915.

GAGE.—Records are kept of width of gate opening and of head of water on the orifice.

DISCHARGE MEASUREMENTS.—Made in flume above and below wasteway, and difference between the two measurements taken as outflow from wasteway.

ACCURACY.—The coefficient of discharge is somwhat uncertain for discharge that varies much from those shown in table of discharge measurements, but the total for the year is probably not materially in error.

COOPERATION.—Results furnished by United States Reclamation Service.

The Olene wasteway is used to supply water from Link River to supplement the flow of Lost River when the latter is insufficient to supply the G canal. The records are used in obtaining the total natural flow of Lost River.

Discharge measurements of Olene wasteway at Olene, Oreg., during the year ending Sept. 30, 1915.

Head.[a]	Height of gate.	Width of gate.	Area of opening.	Discharge.	Coefficient of discharge.
Feet.	*Feet.*	*Feet.*	*Sq. ft.*	*Sec.-ft.*	
3.94	0.75	2.10	1.58	17.2	0.65
3.90	.70	2.10	1.47	14.0	.60

[a] On center of gate opening.

Daily discharge, in second-feet, of Olene wasteway at Olene, Oreg., for the year ending Sept. 30, 1915.

Day.	June.	July.	Aug.	Sept.	Day.	June.	July.	Aug.	Sept.
1	....	0	23.3	0	16	10.6	0	0	....
2	....	9.8	4.5	0	17	4.5	0	1.2	....
3	....	13.7	13.8	0	18	11.6	0	0	....
4	0	13.8	13.8	0	19	13.2	0	0	....
5	4.5	11.8	13.8	1.2	20	0	0	0	....
6	4.5	5.3	11.8	1.2	21	3.6	0	3.1	....
7	37.2	4.8	6.5	1.2	22	0	0	3.1	....
8	35.0	9.8	11.4	1.2	23	7.7	0	1.2	....
9	37.2	17.6	4.3	0	24	0	0	1.2	....
10	25.0	9.8	3.3	....	25	0	7.7	3.2	....
11	14.9	4.5	7.0	....	26	7.6	7.5	3.2	....
12	9.6	4.5	4.0	....	27	12.4	0	3.2	....
13	9.6	4.4	3.1	....	28	0	3.4	3.1	....
14	0	0	3.1	....	29	0	3.4	1.2	....
15	0	0	1.2	....	30	0	7.6	1.2	....
					31	....	16.0	1.2	....

NOTE.—Discharge computed from records of gate opening; head on gate and coefficient of discharge derived from current-meter measurements.

Monthly discharge of Olene wasteway at Olene, Oreg., for the year ending Sept. 30, 1915.

Month.	Discharge in second-feet.			Run-off (total in acre-feet).
	Maximum.	Minimum.	Mean.	
June	37.2	0	8.50	511
July	17.6	0	5.01	308
August	23.3	0	4.87	299
September	1.2	0	.16	10
The period				1,130

"G" CANAL[1] NEAR OLENE, OREG.

LOCATION.—In the SW. ¼ sec. 29, T. 39 S., R. 10 E., about 200 feet below head gates and 4 miles below Olene, Klamath County.

RECORDS AVAILABLE.—July 1, 1912, to September 30, 1915.

GAGE.—Gurley graph water-stage recorder.

DISCHARGE MEASUREMENTS.—Made from a wagon bridge about 1,500 feet below intake.

CHANNEL AND CONTROL.—Control is a timber check about one-half mile below gage; checks the water back to the intake.

EXTREMES OF DISCHARGE.—Maximum discharge, 107 second-feet for a stage of 3.39 feet July 25. No flow at times.

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[1] Formerly called Griffith lateral.

Accuracy.—Results good. The results of changes in the check, as shown by the graph of the gage height, have been used in determining corrections to gage readings. Varying heads on the intake structure also had considerable effect on the stage-discharge relation.

Cooperation.—Records furnished by United States Reclamation Service.

Discharge measurements of "G" canal near Olene, Oreg., during the year ending Sept. 30, 1915.

Date.		Made by—	Gage height.	Discharge.	Date.		Made by—	Gage height.	Discharge.
			Feet.	*Sec.-ft.*				*Feet.*	*Sec.-ft.*
May	5	H. W. Humphrey	2.14	60.4	July	19	C. P. Hughes	2.70	58.6
	10	C. P. Hughes	2.26	70.0		26	.....do	3.37	106
	14	H. W. Humphrey	2.04	53.8	Aug.	3	Humphrey & Leavitt	2.96	84.2
	26	C. P. Hughes	3.10	66.1		8	A. L. Leavitt	2.52	67.4
June	2	.....do	3.22	94.0		16	.....do	2.27	50.2
	4	.....do	3.06	96.4		23	.....do	2.62	66.9
	10	.....do	3.16	86.1		30	.....do	1.90	48.1
	22	.....do	3.70	96.1	Sept.	6	.....do	1.54	26.0
	29	.....do	3.50	93.5		13	.....do	1.74	34.6
July	7	Humphrey and Hughes	3.10	60.8		20	.....do	1.75	36.4
	11	C. P. Hughes	2.80	46.6		30	H. W. Humphrey	1.49	24.9

Daily discharge, in second-feet, of "G" canal near Olene, Oreg., for the year ending Sept. 30, 1915.

Day.	May.	June.	July.	Aug.	Sept.	Day.	May.	June.	July.	Aug.	Sept.
1	0	101	94	85	36	16	48	81	71	51	36
2	0	99	86	85	33	17	49	87	72	55	36
3	24	98	84	84	30	18	48	92	59	59	36
4	49	95	78	82	26	19	24	94	97	62	36
5	60	98	72	78	28	20	28	97	98	66	36
6	65	99	74	74	37	21	35	99	96	66	36
7	68	98	62	76	46	22	35	96	82	68	36
8	76	97	57	68	46	23	44	87	78	66	35
9	82	94	47	66	35	24	51	104	76	53	30
10	76	90	45	66	35	25	59	100	107	53	26
11	68	86	45	64	34	26	66	98	104	46	26
12	66	84	47	60	35	27	67	90	91	56	25
13	53	84	49	49	35	28	66	94	88	55	25
14	52	88	54	41	35	29	92	96	96	56	25
15	50	76	62	38	36	30	94	95	96	51	24
						31	96	....	97	39	....

Note.—Discharge determined by indirect method for shifting control. The correction curve is fairly well defined.

Monthly discharge of "G" canal near Olene, Oreg., for the year ending Sept. 30, 1915.

Month.	Discharge in second-feet.			Run-off (total in acre-feet).	Accuracy.
	Maximum.	Minimum.	Mean.		
May	96	0	54.5	3,350	B.
June	104	76	93.2	5,550	B.
July	107	45	76.3	4,690	B.
August	85	38	61.9	3,810	B.
September	46	24	33.2	1,980	B.
The period	....	....	....	19,300	

LOWER KLAMATH LAKE NEAR BROWNELL, CAL.

Location.—In sec. 35, T. 47 N., R. 2 E., at Laird's landing at the extreme south end of Lower Klamath Lake, about 6 miles southeast of Brownell, Siskiyou County.

Records available.—January 23, 1907, to July 15, 1909; August 1, 1912, to September 30, 1915.

Gage.—Vertical staff on northeast bent of wharf; datum, 4.085.00 [1] feet above sea level; up to August 12, 1915, and 4,083.18 feet after that date; readings for 1915 reduced to a datum 4,080 feet above sea level. Vertical staff, 1907 to 1909; datum, 4,082.5 feet above sea level.

Extremes of stage.—Maximum stage recorded during year, 4,086.6 feet April 30; minimum stage recorded, 4,084.78 feet August 28, 30, and September 11, 19.

1907–1909 and 1912–1915: Maximum stage recorded, 4,087.4 feet April 28 and 29, 1914; minimum stage recorded, 4,084.10 feet September 10 to 22, 1908.

Cooperation.—Records furnished by U. S. Reclamation Service.

Daily gage height, in feet, of Lower Klamath Lake near Brownell, Cal., for the year ending Sept. 30, 1915.

Day.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.
1	5.20	5.30	5.40	....	5.40	6.00	6.00	6.50	6.40	5.70	5.10	4.98
2	5.10	5.30	5.30	5.40	5.40	6.00	....	6.40	....	5.80	5.10	4.88
3	5.30	5.30	5.30	5.30	....	6.00	....	6.40	....	5.80	5.20	4.98
4	5.30	5.30	5.20	5.40	....	5.90	....	6.50	6.30	5.70	5.10	4.88
5	5.40	5.30	5.30	5.30	....	6.00	....	6.40	6.30	5.80	5.10	4.88
6	5.30	5.30	5.40	5.40	....	6.00	....	6.50	6.20	....	5.10	4.98
7	5.30	5.30	5.30	5.40	5.40	6.10	....	6.40	6.20	5.70	5.00	4.88
8	5.10	5.30	5.30	5.30	....	6.10	....	6.50	6.30	5.60	....	4.88
9	5.20	5.40	5.40	5.30	....	6.10	....	6.30	6.20	5.60	....	4.98
10	5.30	5.30	5.30	....	....	6.10	....	6.30	6.20	5.70	....	4.88
11	5.30	5.30	5.30	....	....	6.00	6.10	6.30	6.20	5.60	....	4.78
12	5.30	5.30	5.40	5.20	5.40	5.90	6.10	6.40	6.10	5.70	....	4.88
13	5.30	5.30	5.40	5.30	5.50	5.90	6.20	6.40	6.20	5.60	....	4.88
14	5.30	5.40	5.40	5.30	5.50	6.00	6.40	6.40	6.10	5.70	....	4.98
15	5.30	5.40	5.30	5.20	5.60	6.10	6.20	6.50	6.00	....	....	4.88
16	5.30	5.40	5.40	5.30	5.70	6.10	6.30	6.40	6.10	5.60	4.98	4.98
17	5.30	5.40	5.30	5.30	5.70	....	6.30	6.30	6.00	5.50	4.88	4.88
18	5.30	5.40	5.40	5.30	5.70	5.90	6.30	6.40	5.90	5.60	4.98	4.88
19	5.40	5.40	5.40	5.30	5.70	6.00	6.20	6.50	6.00	5.50	4.88	4.78
20	5.30	5.40	5.40	....	5.70	6.30	6.30	6.40	6.00	5.40	4.88	4.88
21	5.40	5.40	5.30	....	5.70	....	....	6.30	5.90	5.40	4.88	4.98
22	5.30	5.30	5.40	....	5.70	....	....	6.40	6.00	5.30	4.98	4.88
23	5.30	5.30	5.40	....	5.80	6.30	6.30	....	5.90	5.40	4.88	4.98
24	5.30	5.40	5.40	....	5.80	6.30	6.30	6.30	6.00	5.30	4.88	5.08
25	5.40	5.30	5.40	5.30	5.80	6.20	6.20	6.30	6.10	5.30	4.98	4.98
26	5.30	5.30	5.30	5.30	5.90	6.30	6.30	6.40	5.90	5.30	4.98	4.98
27	5.30	5.30	5.40	5.40	5.90	6.40	6.40	6.30	5.90	5.20	4.88	5.08
28	5.30	5.30	5.40	5.30	5.90	6.30	6.30	6.40	5.80	5.10	4.78	4.98
29	5.30	5.30	5.40	5.30	....	6.50	6.50	6.30	5.80	5.20	4.88	4.98
30	5.40	5.30	5.40	5.30	....	6.60	6.60	6.40	5.90	5.20	4.78	4.98
31	5.40	....	5.40	5.40	....	....	....	6.30	....	5.30	4.88	....

Note.—Gage heights in the above table refer to a datum 4,080 feet above sea level.

EAST FORK OF SCOTT RIVER AT CALLAHAN, CAL.

Location.—In the SW. ¼ SW. ¼ sec. 16, T. 40 N., R. 8 W., in Shasta National Forest, at highway bridge at Callahan, Siskiyou County, about 800 feet above junction with South Fork.

Drainage area.—Not measured.

Records available.—October 6, 1913, to September 30, 1915 (fragmentary).

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[1] Reported erroneously as 4,084 feet in Water-Supply Paper 391.

Gage.—Staff in two sections on left bank; read once a day by F. H. Williams. Lower section is inclined and is fastened to cottonwood tree 10 feet upstream from bridge; upper section is vertical and is fastened to left abutment of bridge.

Discharge measurements.—Made from bridge or by wading.

Channel and control.—Boulders and small gravel; fairly permanent. One channel at all stages.

Extremes of stage.—Maximum stage recorded during year, 7.4 feet at 7 p. m., June 8; minimum stage recorded, 5.15 feet, September 12, 19, and 24.

1913–1915: Maximum stage recorded, 7.45 feet at 4 p. m., April 11, 1914; minimum stage recorded, 5.13 feet from 10.30 to 11 a. m. (discharge measurement), September 9, 1913 (discharge, 8.2 second-feet).

Diversions.—No information.

Regulation.—No information.

Cooperation.—Gage-height record furnished by United States Forest Service. Data inadequate for determination of discharge.

The following discharge measurement was made by H. J. Tompkins:

September 14, 1915: Gage height, 5.18 feet; discharge, 9.5 second-feet.

Daily gage height, in feet, of East Fork of Scott River at Callahan, Cal., for the year ending Sept. 30, 1915.

Day.	Oct.	Nov.	Dec.	Apr.	May.	June.	July.	Aug.	Sept.
1					6.75	7.15			
2									
3	5.26		5.35		6.55	6.95	6.4	5.6	
4	5.25				6.5				
5			5.32				6.3		
6		5.37				7.15			
7	5.25				6.4				5.20
8	5.26	5.37				7.4			
9		5.37				7.15			
10				6.5					
11	5.27								
12						6.55	6.1		5.15
13	5.30		5.30			6.55		5.4	
14									
15		5.36			6.8				
16				6.85		6.7			
17	5.70	5.37			6.9	6.7			5.17
18	5.85					6.8			
19						6.7			5.15
20		5.36		7.25	6.7			5.1	
21						6.5			
22	5.50				7.0	6.5			
23	5.45					6.5			
24		5.38		6.8	7.05				5.15
25						6.4			
26							5.7		
27	5.40	5.37		6.8	7.0				
28					7.1				
29		5.38			7.2	6.4	5.6		
30	5.37			6.75					
31									

SCOTT RIVER AT CALLAHAN, CAL.

Location.—In the NE. ¼ sec. 17, T. 40 N., R. 8 W., in Shasta National Forest, at highway bridge three-fourths mile below junction of East and South forks, 1 mile northwest of Callahan, Siskiyou County. Wildcat Creek enters 500 feet above and Sugar Creek 1½ miles below the station.

Drainage area.—Not measured.

Records available.—June 12, 1911, to September 30, 1915 (fragmentary).

Gage.—Vertical staff in two sections on right bank; read once a day by F. H. Williams. Original gage was just above power house, about 2,000 feet above present location. November 14, 1912, gage was installed at present location, independent datum, and June 26, 1914, its datum was raised 0.91 foot.

Discharge measurements.—Made from highway bridge at gage or by wading.

Channel and control.—Gravel and boulders; fairly permanent. One channel at all stages.

Extremes of discharge.—Maximum stage recorded during year, 3.4 feet at 11.30 a. m., June 6 (discharge, 885 second-feet); minimum stage recorded, 0.95 foot, September 13 and 24 (discharge, 18 second-feet).

1911–1915: Maximum stage recorded, 3.4 feet at 11.30 a. m., June 6, 1915 (discharge, 885 second-feet); minimum stage recorded, 2.0 feet (old datum), September 25 and 28, 1913 (discharge, 11 second-feet).

Diversions.—No information.

Regulation.—No information.

Accuracy.—Results good for days on which gage was read.

Cooperation.—Gage-height record furnished by United States Forest Service.

The following discharge measurement was mase by H. J. Tompkins:

September 14, 1915: Gage height, 1.00 foot; discharge. 21 second-feet.

Daily discharge, in second-feet, of Scott River at Callahan, Cal., for the year ending Sept. 30, 1915.

Day.	Oct.	Nov.	Dec.	Apr.	May.	June.	July.	Aug.	Sept.
1					545	820			
2									
3	33		55		520		445	92	
4					422				
5			54				400		
6		55				885			21
7	33				400				
8		55							
9		55							
10				470					
11	33							58	
12						622	335		
13	37		50			595		58	18
14									21
15		52							
16				545		595			
17									21
18	148	54							
19				732			185		21
20							185	31	
21						545			
22							185		
23	74	55			650				
24				622					18
25						445	160		
26									
27	58			595					
28					790				
29		58			820	445			
30				570					
31									

Note.—Discharge determined from a fairly well defined rating curve.

INDIAN CREEK NEAR HAPPY CAMP, CAL.

Location.—In the NW. ¼ sec. 22, T. 17 N., R. 7 E., in Klamath National Forest, at highway bridge at Roberts ranch, about 4¾ miles north of Happy Camp, Siskiyou County, and junction with Klamath River.

Drainage area.—Not measured.

Records available.—September 8, 1911, to September 30, 1915 (fragmentary).

Gage.—Staff in three sections; read once a day by M. M. Morgan. Section No. 1 is vertical and fastened to stump on right bank 2 feet above bridge; No. 2 is vertical and fastened to right abutment of bridge near downstream end; No. 3 is inclined and fastened to alder tree on left bank 12 feet below bridge. Original gage was vertical staff fastened to alder tree on left bank about 700 feet above bridge. November 20, 1912, present gage was installed at an independent datum.

Discharge measurements.—Made from bridge at gage or by wading.

Channel and control.—Small boulders and gravel; permanent.

Extremes of discharge.—Maximum stage recorded during year, 9.2 feet at 10 a. m. February 1 (discharge, 5,180 second-feet, determined from extension of rating curve and may be subject to error); minimum stage recorded, 2.75 feet September 8, 12, 25, and 29 (discharge, 34 second-feet).

1911–1915: Maximum stage recorded, 10.6 feet February 17, 1912 (discharge, 8,430 second-feet, determined from extension of rating curve and may be subject to error); minimum stage recorded, 2.5 feet August 19 to September 6, 1914 (discharge, 20 second-feet).

Diversions.—The Reeve Davis Consolidated Mining Co.'s ditch diverts water above and returns it to the stream below the station; other small ditches use water for mining purposes.

Regulation.—None.

Accuracy.—Results good for days when gage was read.

Cooperation.—Gage-height record furnished by United States Forest Service.

The following discharge measurement was made by H. J. Tompkins:

September 8, 1915: Gage height, 2.76 feet; discharge, 42 second-feet.

Daily discharge, in second-feet, of Indian Creek near Happy Camp, Cal., for the year ending Sept. 30, 1915.

Day.	Oct.	Nov.	Dec.	Jan.	Feb.	Sept.	Day.	Oct.	Nov.	Dec.	Jan.	Feb.	Sept.
1			110		5,180		16						
2		205	130				17				295		
3		155					18	430		130	235		
4			155				19	1,770					
5			155				20						
6							21		47				
7							22	220		75			
8						34	23		42				
9							24		37				
10	130						25						34
11							26						
12						34	27		90				
13			130				28	155	168		235		
14							29						34
15							30						
							31	90		110	675		

Note.—Discharge determined from a rating curve well defined except for extremely high and low water.

SALMON RIVER AT SOMESBAR, CAL.

Location.—In the SE. ¼ sec. 2, T. 13 N., R. 6 E., below suspension footbridge about 600 feet northeast of Somesbar post office, Siskiyou County, and about 1¾ miles above junction with Klamath River.

Drainage area.—Not measured.

Records available.—September 17, 1911, to September 8, 1915, when the station was discontinued.

Gage.—Vertical staff in two sections on right bank about 900 feet below bridge; lower section is fastened to an alder tree; upper section is also fastened to an alder tree 15 feet upstream. Gage is read once a day by W. H. Hotelling.

Discharge measurements.—Made from bridge above gage or by wading.

Channel and control.—Boulders and gravel; fairly permanent. Both banks are high and not subject to overflow.

Extremes of discharge.—Maximum stage recorded during year, 11.8 feet at 4 p. m. February 1 (discharge, 23,600 second-feet, determined from extension of rating curve and may be subject to error); minimum stage recorded, 3.50 feet at 6 a. m. September 7 and 8 (discharge, 225 second-feet).

1911–1915: Maximum stage recorded, 14.1 feet at 3.30 p. m. February 17, 1912 (discharge, 33,000 second-feet, determined from extension of rating curve and may be subject to error); minimum stage recorded, 3.5 feet September 20 to 25, October 6 to 8, and November 3 to 7, 1911 (discharge, 180 second-feet).

Diversions.—None.

Regulation.—None.

Accuracy.—For days when gage was read results excellent except for extremely high water.

Cooperation.—Gage-height record furnished by W. H. Hotelling.

Discharge measurements of Salmon River at Somesbar, Cal., during the year ending Sept. 30, 1915.

Date.	Made by—	Gage height.	Discharge.	Date.	Made by—	Gage height.	Discharge.
		Feet.	*Sec.-ft.*			*Feet.*	*Sec.-ft.*
Nov. 2	Charles Leidl	4.33	677	Aug. 8	Carl Langford	3.9	380
2	.....do	4.30	654				

Daily discharge, in second-feet, of Salmon River at Somesbar, Cal., for the year ending Sept. 30, 1915.

Day.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.
1	269	850		545	15,900	2,460	5,830	5,830	4,710	2,460	445	252
2			905	580	16,600		6,430			2,100		246
3				580	9,990	2,650	6,740	3,490	4,710		445	243
4					5,830		6,130					243
5						2,650		3,270	4,980	1,770	385	240
6			1,620	1,200			5,830			1,770	385	
7		960		1,330	3,270	2,850		3,270	5,260	1,620		225
8				4,450			5,260	3,270	5,260		409	225
9	272			2,280		2,960		5,540		1,470		
10						3,060	4,980	6,130		1,470	385	
11				1,200			4,980	4,710	5,260	1,540		
12					3,490.		4,710		5,260	1,400	385	
13		1,020		1,260						1,330		
14				3,720			4,200	4,450	3,720	1,200	385	
15			1,620	3,960		3,060	3,960			1,020		
16					1,930			5,260		850	355	
17						3,270		5,260			345	
18							4,200		2,850	850	330	
19		1,060				4,200	4,710	4,450		850	312	
20	5,830			1,400			5,260	3,960				
21			850		3,490	4,450	5,830	3,720	2,460			
22							5,830	3,270		850	312	
23				1,330		4,710		3,270	2,460			
24								3,720		660	312	
25			620			4,710	5,260			660		
26								3,960	2,100	620		
27						4,980	5,260	4,710		580	290	
28					2,100				1,930	545	286	
29						5,260		4,710	1,770	510	283	
30		510	445	1,470		5.540	5,830		2,280		280	
31	445		445	4,450		5,830		5,260			276	

Note.—Discharge determined from a rating curve well defined below 8,000 second-feet.

TRINITY RIVER AT LEWISTON, CAL.

Location.—In the NE. ¼ sec. 19, T. 33 N., R. 8 W., at highway bridge at Lewiston, Trinity County, and about 9 miles below Stewarts Fork. Indian Creek enters 6 miles below the station.

Drainage area.—Not measured.

Records available.—August 28, 1911, to September 30, 1915.

Gage.—Vertical staff in two sections on left bank at bridge; read twice a day by W. W. Phillips. Lower section fastened to pile 10 feet upstream from bridge; upper section fastened to downstream end of bridge abutment.

Discharge measurements.—Made from bridge, at gage, or by wading.

Channel and control.—Small boulders and gravel; appears permanent. Both banks are subject to overflow at extremely high water.

Extremes of discharge.—Maximum stage during year, 15.2 feet at 10 a. m., crest of flood of February 2 (discharge, 23,000 second-feet, determined from extension of rating curve and may be subject to error); minimum stage recorded, 2.4 feet October 1 and September 26 to 30 (discharge, 175 second-feet).

1911–1915: Maximum stage recorded, 16.7 feet at 12.30 p. m. January 2, 1914 (discharge, 26,900 second-feet, determined from extension of rating curve and may be subject to error); minimum stage recorded, 2.28 feet, September 1, 1911 (discharge, 145 second-feet).

Diversions.—Water is diverted above the station for irrigation, placer mining, and power development.

Regulation.—None.

Accuracy.—Results excellent.

The following discharge measurement was made by H. J. Tompkins:

September 16, 1915: Gage height, 2.60 feet; discharge, 230 second-feet.

Daily discharge, in second-feet, of Trinity River at Lewiston, Cal., for the year ending Sept. 30, 1915.

Day.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.
1	175	545	360	360	9,520	3,520	7,060	5,980	9,960	3,800	765	258
2	190	545	360	360	18,200	3,250	7,450	5,480	9,300	3,940	765	240
3	205	435	410	385	8,050	2,990	7,850	4,390	9,300	3,940	765	238
4	205	410	460	460	4,690	2,730	7,060	3,940	9,090	3,800	700	258
5	205	360	515	460	3,800	2,860	5,980	3,800	9,520	3,660	668	240
6	205	360	460	635	2,990	2,730	5,640	3,940	9,960	3,120	635	222
7	205	315	460	765	2,600	2,730	5,980	5,160	9,520	2,730	575	240
8	205	315	460	942	7,060	2,470	6,680	5,810	9,520	2,730	515	222
9	410	315	515	870	6,680	2,470	6,150	7,850	9,960	2,470	515	205
10	700	315	488	732	4,840	2,600	5,640	11,100	8,460	2,470	515	205
11	385	315	460	635	3,800	2,730	5,980	9,090	7,450	2,230	488	205
12	338	275	460	635	2,860	3,800	6,680	8,670	5,810	2,470	488	205
13	315	275	460	700	2,470	3,940	6,680	7,250	5,640	2,230	460	205
14	295	315	435	635	2,110	4,240	5,640	6,320	5,810	1,890	435	205
15	275	295	410	635	2,000	4,390	5,320	5,980	5,640	1,780	410	205
16	275	275	410	605	4,240	4,690	6,320	5,980	5,640	1,580	410	205
17	1,480	275	385	575	6,320	5,160	6,680	10,400	5,000	1,580	410	205
18	980	275	360	545	6,320	5,320	7,060	7,850	4,690	1,440	410	205
19	2,230	275	360	515	5,160	5,640	8,460	6,680	4,540	1,440	410	205
20	1,220	275	360	515	4,540	5,480	8,880	5,980	4,540	1,340	385	205
21	800	275	360	515	3,940	6,320	8,670	5,810	4,390	1,340	338	205
22	668	258	338	488	3,520	7,060	7,060	5,810	4,690	1,340	338	205
23	545	240	360	460	3,660	7,060	6,680	6,150	4,690	1,440	315	205
24	488	240	360	410	4,690	7,450	5,980	7,850	4,490	1,580	315	190
25	410	275	360	460	4,690	7,060	5,980	7,450	3,800	1,300	315	190
26	410	275	360	515	4,090	7,060	5,320	8,050	3,520	1,180	315	175
27	360	258	360	732	3,940	7,650	6,320	8,250	3,250	1,060	315	175
28	360	315	360	2,230	3,800	18,500	11,100	9,740	3,660	980	275	175
29	360	360	360	4,540	....	13,200	10,600	9,090	4,090	905	275	175
30	360	360	360	5,810	....	10,600	8,670	9,090	3,800	800	275	175
31	360	....	360	4,690	....	8,880	....	8,670	....	870	275	....

Note.—Discharge determined from a rating curve well defined below 10,000 second-feet.

Monthly discharge of Trinity River at Lewiston, Cal., for the year ending Sept. 30, 1915.

Month.	Discharge in second-feet.			Run-off (total in acre-feet).	Accuracy.
	Maximum.	Minimum.	Mean.		
October	2,230	175	504	31,000	A.
November	545	240	321	19,100	A.
December	515	338	404	24,800	A.
January	5,810	360	1,060	65,200	A.
February	18,200	2,000	5,020	279,000	A.
March	18,500	2,470	5,630	346,000	B.
April	11,100	5,320	6,990	416,000	A.
May	11,100	3,800	7,020	432,000	A.
June	9,960	3,250	6,310	375,000	A.
July	3,940	800	2,050	126,000	A.
August	765	275	454	27,900	A.
September	338	175	212	12,600	A.
The year	18,500	175	2,980	2,150,000	

TRINITY RIVER AT HOOPA, CAL.

Location.—In the NW. ¼ sec. 25, T. 8 N., R. 4 E., at Hoopa Indian Agency, Humboldt County, about 1 mile above Hoopa Ferry, and about 11 miles above junction with Klamath River.

Drainage area.—Not measured.

Records available.—September 3, 1911, to December 7, 1914 (broken).

Gage.—Staff in four sections on left bank 800 feet above mouth of Supply Creek; read twice a day by Berryman Lack, jr.

Discharge measurements.—Made from standard gaging car on ferry cable 1 mile below gage. As Supply Creek enters between gage and ferry, it is necessary to deduct discharge of this stream from measurements made at ferry to obtain flow at gage.

Channel and control.—Sand and gravel; fairly permanent. One channel at all stages.

Extremes of discharge.—1911–1914: Maximum stage recorded, 28.1 feet at 5 p. m. December 31, 1913 (discharge, 89,000 second-feet, determined from extension of rating curve and may be subject to error); minimum stage recorded, 4.4 feet September 3, 1911 (discharge, 375 second-feet).

Diversions.—None.

Regulation.—None.

Accuracy.—Results good for days when gage was read.

Cooperation.—Gage-height record furnished by United States Indian Service.

Discharge measurements of Trinity River at Hoopa, Cal., during the year ending Sept. 30, 1915.

[Made by Charles Leidl.]

Date.	Gage height.	Discharge.
	Feet.	*Sec.-ft.*
Oct. 31	5.56	938
31	5.56	933

Daily discharge, in second-feet, of Trinity River at Hoopa, Cal., for the period Nov. 1 to Dec. 7, 1914.

Day.	Nov.	Dec.	Day.	Nov.	Dec.	Day.	Nov.	Dec.
1	1,190	1,540	11	845	....	21	770	....
2	1,190	1,440	12	845	....	22	770	....
3	1,340	1,760	13	805	....	23	735	....
4	1,060	2,240	14	805	....	24	735	....
5	1,060	2,120	15	805	....	25	735	....
6	970	2,120	16	805	....	26	735	....
7	970	2,240	17	770	....	27	805	....
8	970	....	18	805	....	28	1,060	....
9	885	....	19	805	....	29	....	....
10	845	....	20	805	....	30	....	....
						31	....	....

NOTE.—Discharge determined from a rating curve well defined below and fairly well defined above 1,300 second-feet.

COFFEE CREEK AT COFFEE, CAL.

LOCATION.—In the NW. ¼ sec. 4, T. 37 N., R. 8 W., in Shasta National Forest, at private highway bridge at Coffee, Trinity County, and 5 miles above junction with Trinity River. Boulder Creek enters 400 feet above and Little Boulder Creek 1½ miles below the station.

DRAINAGE AREA.—Not measured.

RECORDS AVAILABLE.—December 16, 1910, to October 21, 1914, when station was discontinued; record fragmentary.

GAGE.—Vertical staff fastened to upstream end of bridge pier near right bank; read once a day by Edward Abernathy.

DISCHARGE MEASUREMENTS.—Made from downstream side of bridge at gage or by wading.

CHANNEL AND CONTROL.—Gravel and boulders; fairly permanent.

EXTREMES OF DISCHARGE.—1911–1914: Maximum stage recorded, 7.0 feet May 27 and June 3 to 5, 1912 (discharge, 2,630 second-feet); minimum stage recorded, 3.45 feet September 28 to October 7, 1914 (discharge, 34 second-feet).

DIVERSIONS.—None.

REGULATION.—From April to July, inclusive, and occasionally throughout the remainder of the year, two dams with automatic or "self-shooting" gates are operated about 10 miles above the station. The Nash mine operates a dam having a working capacity of about 125 acre-feet. The Holland mine, on the East Fork, operates a dam having a working capacity of about 40 acre-feet. At the beginning of the season, in April, these dams fill and "shoot" about once an hour; at the end of the season, in July, once in 20 or 24 hours. During high water these "floods" are hardly perceptible, but late in the season their effect is pronounced. An effort is made to secure gage readings when the flow is normal.

ACCURACY.—No discharge measurements were secured since September, 1913. The 1912–13 rating curve was used till station was discontinued. The gage-height record, on account of the operation of the self-shooting dam, is subject to some error. Otherwise the results are good.

COOPERATION.—Gage-height record furnished by United States Forest Service.

Daily discharge, in second-feet, of Coffee Creek at Coffee, Cal., for the period Oct. 1–21, 1914.

Day.	Oct.	Day.	Oct.
1	34	11	95
2	34	12	88
3	34	13	48
4	34	14	48
5	34	15	81
6	34	16	95
7	34	17	81
8	58	18	69
9	210	19	69
10	152	20	58
		21	39

NOTE.—Discharge determined from a fairly well defined rating curve. Mean discharge Oct. 1-21, 68.0 second-feet; total run-off, 2,830 acre-feet.

SMITH RIVER BASIN.

MIDDLE FORK OF SMITH RIVER NEAR CRESCENT CITY, CAL.

LOCATION.—In the NE. ¼ SE. ¼ sec. 20, T. 17 N., R. 2 E., at highway bridge 800 feet above junction of North and Middle forks, one-eighth mile east of Gasquet, and 14 miles northeast of Crescent City, Del Norte County.

DRAINAGE AREA.—Approximately 146 square miles.

RECORDS AVAILABLE.—September 8, 1911, to September 30, 1915 (not complete).

GAGE.—Chain gage attached to downstream guardrail of bridge. May 26, 1913, an inclined staff in two sections was installed on right bank 60 feet upstream from bridge. Original datum was not maintained. Chain gage is read during low water when staff gage can not be read. Gage is read once a day by A. W. Lewis.

DISCHARGE MEASUREMENTS.—Made from bridge at gage or by wading.

CHANNEL AND CONTROL.—Rough; composed of boulders and gravel; somewhat shifting. Both banks are high and not subject to overflow.

EXTREMES OF DISCHARGE.—Maximum stage recorded during year, 15.0 feet at 8.30 a. m. February 1 (discharge, 10,800 second-feet); minimum stage recorded, 3.60 feet (chain gage) at 5 p. m. August 29 and 8 a. m. August 30 (discharge, 50 second-feet).

1911–1915: Maximum stage recorded, 17.1 feet at 8 a. m. February 17, 1912 (discharge, 13,900[1] second-feet, determined from extension of rating curve and may be subject to errors); minimum stage recorded, 3.60 feet (chain gage) at 5 p. m. August 29 and 8 a. m. August 30, 1915 (discharge, 50 second-feet).

DIVERSIONS.—None.

REGULATION.—None.

ACCURACY.—Results fair for the chain gage (low water) and excellent for the staff gage.

COOPERATION.—Gage-height record furnished by United States Forest Service.

Discharge measurements of Middle Fork of Smith River near Crescent City, Cal., during the year ending Sept. 30, 1915.

[Made by Charles Leidl.]

Date.	Gage height.		Discharge.	Date.	Gage height.		Discharge.
	Chain gage.	Staff gage.			Chain Gage	Staff Gage	
	Feet.	*Feet.*	*Sec.-ft.*		*Feet.*	*Feet.*	*Sec.-ft.*
Oct. 18	5.44	5.64	510	Oct. 20	7.26	7.42	1,450
19	11.00	11.00	5,380				

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[1] Discharge published in Water-Supply Paper 391 is in error.

Daily discharge, in second-feet, of Middle Fork of Smith River near Crescent City, Cal., for the year ending Sept. 30, 1915.

Day.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.
1	91	760	685	785	10,800	950	785	315	505	....	68	60
2	....	....	685	868	5,380	868	1,200	280	465	140	70	56
3	....	405	868	840	4,990	785	1,570	265	425	140	66	62
4	....	350	840	1,340	3,540	760	1,070	250	405	136	....	54
5	....	....	895	1,070	2,150	685	868	250	385	132	....	56
6	....	....	1,070	1,650	1,570	660	....	....	385	145	....	58
7	....	590	1,200	2,060	1,570	590	....	250	385	165	....	60
8	80	....	1,650	7,490	1,420	568	....	280	350	140	....	58
9	80	....	3,420	3,660	1,570	....	568	350	332	140	....	60
10	385	590	1,890	2,150	1,200	....	545	545	....	124	....	58
11	505	568	1,200	1,490	1,070	....	525	568	....	110	....	....
12	315	545	950	1,270	1,010	505	590	525	....	104	....	58
13	....	635	710	1,890	785	612	685	425	....	100	....	62
14	....	280	660	4,620	735	785	....	545	250	100	....	60
15	....	425	545	2,960	635	760	....	660	250	100	60	60
16	....	280	505	....	635	660	....	545	250	....	61	56
17	....	....	465	....	1,200	685	568	590	235	....	62	58
18	....	....	....	....	1,270	685	....	1,890	220	....	61	55
19	....	....	425	....	1,140	612	....	1,810	....	....	59	55
20	....	....	....	....	1,070	612	....	1,070	....	....	61	55
21	....	....	350	....	950	635	....	868	....	....	60	54
22	....	....	....	....	1,490	685	....	760	....	....	56	59
23	....	....	....	....	1,730	685	....	735	....	....	....	61
24	....	....	....	....	1,810	....	....	1,140	....	68	....	70
25	....	....	....	545	1,650	545	....	1,200	....	73	....	65
26	....	....	....	505	1,270	505	....	1,010	....	72	60	62
27	....	250	895	505	1,200	485	350	895	....	73	58	62
28	....	735	....	590	1,140	590	385	785	....	70	58	65
29	....	1,200	568	635	....	612	405	685	....	69	52	....
30	....	868	505	685	....	612	350	635	....	73	52	....
31	205	....	525	....	....	840	....	545	....	72	58	....

NOTE.—Discharge determined from a fairly well defined rating curve for the chain gage and a curve well defined below 8,000 second-feet for the staff gage.

NORTH FORK OF SMITH RIVER NEAR CRESCENT CITY, CAL.

LOCATION.—In the SW. ¼ NE. ¼ sec. 20, T. 17 N., R. 2 E., half a mile northeast of Gasquet, half a mile above junction of North and Middle forks, and about 15 miles northeast of Crescent City, Del Norte County.

DRAINAGE AREA.—Approximately 81 square miles.

RECORDS AVAILABLE.—September 8, 1911, to September 30, 1915 (incomplete).

GAGE.—Staff in four sections on left bank; read once a day by A. W. Lewis. The original gage was washed out November 15, 1911. Its datum was not referenced. Present gage installed December 5, 1911.

DISCHARGE MEASUREMENTS.—Made from car and cable at gage or by wading.

CHANNEL AND CONTROL.—Rough; composed of boulders and gravel. Control has not shifted since the present gage was installed. Both banks are high and not subject to overflow.

EXTREMES OF DISCHARGE.—Maximum stage recorded during year, 20.2 feet at 8.30 a. m. January 8 (discharge, 12,000 second-feet); minimum stage recorded, 8.54 feet, September 18 to 23 and 28 (discharge, 65 second-feet).

1911–1915: Maximum stage recorded, 26.5 feet in the early morning of February 17, 1912 (discharge, 27,000 second-feet, determined from extension of rating curve, and may be subject to error); minimum stage recorded, 3.45 feet (original datum), November 4, 1911 (discharge, 64 second-feet).

Diversions.—None.

Regulation.—None.

Accuracy.—Results excellent for days when gage was read.

Cooperation.—Gage-height record furnished by United States Forest Service.

Discharge measurements of North Fork of Smith River near Crescent City, Cal., during the year ending Sept. 30, 1915.

[Made by Charles Leidl.]

Date.	Gage height.	Discharge.	Date.	Gage height.	Discharge.
	Feet.	*Sec.-ft.*		*Feet.*	*Sec.-ft.*
Oct. 18	13.32	1,970	Oct. 20	14.45	3,010
19	19.30	10,300			

Daily discharge, in second-feet, of North Fork of Smith River near Crescent City, Cal., for the year ending Sept. 30, 1915.

Day.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.
1	252		1,260			1,480	1,480	306	665	157	96	71
2			2,100	1,730		1,200	2,100		665		96	71
3			2,580			1,080	3,100	278	590	148	96	70
4		790	2,580	2,680		1,030	2,000	265	555	148		70
5			2,680	2,000		880	1,400	252	520	148		70
6			2,680	3,210		835				217		68
7			2,680	3,760				228	424	217		68
8	252			12,000				228	424	217		68
9	278		7,120	5,090			745			217		70
10	1,030		2,680				705	930		148		70
11	1,330		2,280	2,190			590	1,140				
12	835		1,640	2,000	1,030	625	625	1,080		132		68
13				4,960		835	1,030	835		132		68
14			1,080	7,280				2,280		132		68
15			930	3,100		1,330		2,100	292	132		68
16			880			1,030			292		81	67
17			790			880		1,260	278		81	67
18					2,000	1,260		4,480	252		81	65
19			665		1,910	1,030		3,210	240		77	
20					1,730	930		2,000	228		77	65
21			625					1,400	228		74	65
22						745		1,260	217			65
23					4,240	665						65
24					3,430			2,680	217			80
25				745	2,680	590		3,650	217			68
26				665	2,000	520		2,190	206	96		68
27				665	1,560	520		1,820	196	96	74	68
28		1,910		835			320	1,330	176	96	74	65
29				930		665	320	1,030	166	96		
30		1,640		930		1,080	306		166	96	73	
31						2,190		790		96	73	

Note.—Discharge determined from a rating curve well defined below 13,000 second-feet.

MISCELLANEOUS MEASUREMENTS.

Miscellaneous discharge measurements in Pacific slope drainage basins for the year ending Sept. 30, 1915.

Streams south of San Francisco Bay.

Date.	Stream.	Tributary to—	Locality.	Gage height.	Discharge.
1915.				*Feet.*	*Sec.-ft.*
Jan. 19	Tia Juana River	Pacific Ocean	2½ miles above Tia Juana, Mexico		0.8
Apr. 6	do	do	Tia Juana, Mexico		44
10	do	do	do		36
6	do	do	Mouth, near Nestor, Cal		37
10	do	do	do		26
5	Cottonwood Creek	Tia Juana River	Marron Valley, Cal	0.30	12
7	San Diego River	Pacific Ocean	Above Boulder Creek, near Lakeside, Cal.		22
July 10	do	do	do		6.6
Mar. 31	do	do	El Capitan Grande dam site, three-eighths mile below mouth of Chocolate Creek.		52
Apr. 7	do	do	do		33
14	do	do	do		20
1914.					
Oct. 16	San Diego flume	Diverts from San Diego River.	Just below Chocolate siphon, near Lakeside, Cal.	.25	1.6
17	do	do	do	.29	2.0
1915.					
Jan. 28	San Diego flume	Diverts from San Diego River.	Just below Chocolate siphon, near Lakeside, Cal.	.90	11.6
Feb. 6	do	do	do	.90	12.1
10	do	do	do	1.12	16.8
Mar. 31	do	do	do	1.20	19.6
Apr. 7	do	do	do	1.20	19.1
14	do	do	do	1.30	22
1914.					
Oct. 17	San Diego flume	Diverts from San Diego River.	Above inflow from El Monte pump, near Lakeside, Cal.		1.6
17	do	do	Below inflow from El Monte pump, near Lakeside, Cal.		2.0
1915.					
Apr. 3	San Diego flume	Diverts from San Diego River.	Grossmont, Cal	1.00	16.4
Mar. 31	South Fork of San Diego River.	San Diego River	300 feet above mouth, near Alpine, Cal.		16
Apr. 7	do	do	do		15
14	do	do	do		7.4
Mar. 31	Chocolate Creek	do	300 feet above mouth, near Lakeside, Cal.		2.3
Apr. 7	do	do	do		1.5
14	do	do	do		1.2
3	Alvarado Creek	do	600 feet above mouth, near San Diego, Cal.		[a] 12
10	East San Pasqual ditch.	Santa Ysabel Creek.	Headgate near Escondido, Cal	4.41	8.0
July 22	Canada Aqua Caliente.	San Luis Rey River.	600 feet above hot springs, near Warner Springs, Cal.		.4
1914.					
Oct. 16	Big Lake Creek	San Luis Rey River.	Near Warner Springs, Cal	2.23	.1
1915.					
Apr. 19	Big Lake Creek	San Luis Rey River.	Near Warner Springs, Cal		.05
June 28	do	do	do	2.50	.05
Mar. 13	Buena Vista Creek	do	Monkey Hill, 6 miles southwest of Warner Springs, Cal.	1.85	1.3
Apr. 19	do	do	do		.3
June 28	do	do	do	1.63	.05
July 11	Temecula Creek	Santa Margarita River.	Pauba grant, Cal., just below junction with Arroyo-Seco.		2.4
Sept. 26	do	do	2½ miles above railway station at Fallbrook, Cal.		3.6
July 11	Arroyo-Seco	Temecula Creek	Just above junction with Temecula Creek, Pauba grant, Cal.		.1
Apr. 15	Plunge Creek	Santa Ana River	Highway bridge near East Highlands, Cal.		6.0
14	Waterman Canyon Creek.	do	Old U. S. G. S. gaging station in SW. ¼ sec. 2, T. 1 N., R. 4 W., 6 miles north of San Bernardino, Cal.	2.03	5.4
July 16	do	do	do	1.70	2.8

[a] Flow includes waste from San Diego flume and leakage from La Mesa Reservoir.

Miscellaneous discharge measurements in Pacific slope drainage basins for the year ending Sept. 30, 1915—Continued.

Streams south of San Francisco Bay—Continued.

Date.	Stream.	Tributary to—	Locality.	Gage height.	Discharge.
1915.				*Feet.*	*Sec.-ft.*
July 16	Devil Canyon Creek.	Santa Ana River	Old U. S. G. S. gaging station at mouth of canyon in SE. ¼ NE. ¼ sec. 6, T. 1 N., R. 4 W., near San Bernardino, Cal.		1.4
16	Cajon Creek	do	Cajon, Cal		1.2
17	Cucamonga Creek	do	Just above intake of Cucamonga Water Co.'s canal, near Ioamosa, Cal.		5.9
5	San Dimas Creek	San Gabriel River.	30 feet above intake of San Dimas Land & Water Co.'s canal near San Dimas, Cal.		1.5
5	Dalton Creek	do	Intake of Glendora Water Co.'s canal near Glendora, Cal.		.3
Aug. 13	Santa Anita River.	San Gabriel River.	Roberts camp, 5 miles from Sierra Madre, Cal.		.9
13	Little Santa Anita River.	do	1¾ miles north of Sierra Madre, Cal		.2
Mar. 23	Pacoima Creek	Los Angeles River.	Mouth, near San Fernando, Cal		12
July 4	do	do	do		1.6
4	Tujunga Creek	do	One-half mile above Gold Canyon, 4 miles northeast of Sunland, Cal.		9.8
Mar. 24	do	do	Mouth of canyon near Sunland, Cal.		59
24	do	do	Southern Pacific R. R. bridge near San Fernando, Cal.		30
July 4	Little Tujunga Creek.	Tujunga Creek	Half a mile above Gold Creek near Sunland, Cal.		.2
Mar. 24	do	do	Mouth of canyon near Sunland, Cal.		3.6
Feb. 25	Millard Canyon Creek.	Arroyo-Seco	100 feet above mouth near Pasadena, Cal.		4.4
Mar. 15	do	do	do		1.8
Aug. 29	Sespe Creek	Santa Clara River.	East line sec. 31, T. 6 N., R. 20 W., 12 miles northwest of Sespe, Cal.		151
Sept. 12	do	do	Just above mouth of Hot Springs Creek, 12 miles northwest of Sespe, Cal.		8.1
11	do	do	Between Hot Springs and Alder creeks, 12 miles north of Sespe, Cal.		11
1914.					
Jan. 7	Sespe Creek	Santa Clara River.	Cable at Bradfield's camp near Sespe, Cal.		31
10	do	do	do		27
13	do	do	do		28
1915.					
Jan. 7	Sespe Creek	Santa Clara River.	Cable at Bradfield's camp near Sespe, Cal.	5.89	103
Sept. 8	do	do	Just below Little Sespe Creek, 3 miles north of Sespe, Cal.		6.2
8	do	do	600 feet below Southern Pacific R. R. bridge, half a mile southeast of Sespe, Cal.		5.0
6	West Fork of Sespe Creek.	Sespe Creek	Just above mouth near Sespe, Cal		1.5
Apr. 27	Hot Springs Creek	do	Just above mouth, 12 miles northwest of Sespe, Cal.		6.4
Sept. 11	do	do	do		1.5
1914.					
Oct. 26	Alder Creek	Sespe Creek	Half a mile above mouth, 12 miles north of Sespe, Cal.		1.1
1915.					
Apr. 29	Alder Creek	Sespe Creek	Half a mile above mouth, 12 miles north of Sespe, Cal.		7.7
Sept. 11	do	do	do		1.0
8	Tar Creek	do	Mouth, 6 miles north of Sespe, Cal		.0
8	Coldwater Canyon Creek.	do	Mouth, 4 miles north of Sespe, Cal		.5
8	Pine Canyon Creek	do	Mouth, 3½ miles north of Sespe, Cal		1.3
8	Little Sespe Creek	do	Mouth, 3 miles north of Sespe, Cal		.0
8	Fillmore canal	Diverts from Sespe Creek.	Few miles northwest of Fillmore, near Sespe, Cal.		12
13	San Lorenzo River.	Pacific Ocean	400 feet above Southern Pacific R. R. bridge, 2 miles below Felton, Cal.		37
13	do	do	50 feet above bridge at powder mill, 2½ miles above Santa Cruz, Cal.		42

Miscellaneous discharge measurements in Pacific slope drainage basins for the year ending Sept. 30, 1915—Continued.

Kern River basin.

Date.	Stream.	Tributary to—	Locality.	Gage height.	Discharge.
1914.				*Feet.*	*Sec.-ft.*
Oct. 3	Kern River	Kern basin	70 feet below mouth of Little Kern River, in sec. 5, T. 21 S., R. 33 E., 29 miles north of Kernville, Cal.	....	328
8	....do	....do	In sec. 4, T. 25 S., R. 33 E., about 5 miles above Kernville, Cal.	....	329
9	....do	....do	Old U. S. G. S. gaging station, half a mile north of Isabella, Cal.	0.85	7.5
10	....do	....do	1½ miles below Borel power house, below Borel, Cal.	....	385
10	....do	....do	Below intake of flume to plant No. 1, at Democrat Springs, Cal.	....	6.2
11	....do	....do	500 feet above spillway of plant No. 1, at Democrat Springs, Cal.	....	17
1	Rattlesnake Creek	Kern River	1 mile above mouth in sec. 3, T. 21 S., R. 33 E., 29 miles north of Kernville, Cal.	....	11
1	Little Kern River	....do	20 feet above Trout Meadow trail ford, sec. 12, T. 20 S., R. 32 E., 34 miles north of Kernville, Cal.	....	23
3	....do	....do	400 feet above mouth in sec. 5, T. 21 S., R. 33 E., 29 miles north of Kernville, Cal.	....	25
3	Freeman Creek	....do	50 feet below Trout Meadow trail, in sec. 35, T. 20 S., R. 32 E., 30 miles north of Kernville, Cal.	....	2.4
5	Peppermint Creek	....do	300 feet below lower trail crossing, in sec. 36, T. 21 S., R. 32 E., 25 miles north of Kernville, Cal.	....	2.2
5	Durrwood Creek	....do	400 feet above mouth, 24 miles north of Kernville, Cal.	....	2.0
6	Dry Creek	....do	500 feet below lower trail crossing, in sec. 22, T. 22 S., R. 32 E., 21 miles north of Kernville, Cal.	....	6.5
6	Little Dry Creek	....do	1,000 feet above mouth, 19 miles north of Kernville, Cal.	....	1.6
6	Brush Creek	....do	200 feet above trail crossing, in sec. 36, T. 22 S., R. 32 E., 19 miles north of Kernville, Cal.	....	3.4
1915. June 14	Brush Creek	Kern River	200 feet above trail crossing, in sec. 36, T. 22 S., R. 32 E., 19 miles north of Kernville, Cal.	....	35
1914. Oct. 7	Tobias Creek	Kern River	2 miles above mouth, 15 miles northwest of Kernville, Cal.	....	2.2
1915. June 13	Tobias Creek	Kern River	2 miles above mouth, 15 miles northwest of Kernville, Cal.	....	13
1914. Oct. 8	Salmon Creek	Kern River	150 feet above road, in sec. 30, T. 23 S., R. 33 E., 13 miles north of Kernville, Cal.	....	3.2
1915. June 15	Salmon Creek	Kern River	150 feet above road, in sec. 30, T. 23 S., R. 33 E., 13 miles north of Kernville, Cal.	....	18
1914. Oct. 8	Corral Creek	Kern River	Near mouth, 11 miles north of Kernville, Cal.	....	.5
9	Kern River Power Co.'s canal.	Diverts from Kern River.	Old U. S. G. S. gaging station at Beattie ranch, three-fourths mile below Kernville, Cal.	5.30	335
1915. June 17	South Fork of Kern River.	Kern River	Old U. S. G. S. gaging station, in SW. ¼ sec. 24, T. 25 S., R. 35 E., 5 miles northeast of Onyx, Cal.	2.32	180
1914. Oct. 9	South Fork of Kern River.	Kern River	Old U. S. G. S. gaging station at Isabella, Cal.	.80	42
8	Powers ditch	Diverts from South Fork of Kern River.	Onyx, Cal.	....	1.1
10	Clear Creek	Kern River	County highway bridge, 1½ miles below Borel, Cal.	....	.2
10	Kern River Power Co.'s flume.	Diverts from Kern River.	Opposite flume tender's house at Democrat Springs, Cal.	....	373

Miscellaneous discharge measurements in Pacific slope drainage basins for the year ending Sept. 30, 1915—Continued.

Tulare Lake basin.

Date.	Stream.	Tributary to—	Locality.	Gage height.	Discharge.
1915.				*Feet.*	*Sec.-ft.*
Feb. 1	Bear Creek	North Fork of Tule River.	Below mouth of Rancheria Creek, near Springville, Cal.		9.7
1	Rancheria Creek	Bear Creek	Mouth, near Springville, Cal		4.6

San Joaquin River basin.

Date.	Stream.	Tributary to—	Locality.	Gage height.	Discharge.
1915.					
Sept. 23	San Joaquin River	Suisun Bay	600 feet below intake of Gravely ford canal near Mendota, Cal.		610
22	do	do	Above intake of Lone Willow slough near Mendota, Cal.	3.60	580
21	do	do	200 feet below Miller & Lux dam near Mendota, Cal., in NE. ¼ sec. 19, T. 13 S., R. 15 E.		59
23	do	do	400 feet below bridge at Firebaugh, Cal.		48
23	do	do	800 feet below Temple slough in SE. ¼ sec. 12, T. 11 S., R. 13 E.		16
25	do	do	One-fourth mile above Merced River near Newman, Cal.		111
22	Lone Willow slough.	San Joaquin River	White house near Mendota, Cal., in NW. ¼ sec. 25, T. 13 S., R. 15 E.	1.62	37
22	Columbia canal	Diverts from Lone Willow slough.	White house near Mendota, Cal., in the NW. ¼ sec. 23, T. 13 S., R. 15 E.	1.59	15.5
1914.					
Apr. 20	Kings River	San Joaquin River	Hardwick Bridge, half a mile west of Hardwick, Cal.	16.7	2,270
21	do	do	do	15.5	3,160
22	do	do	do	16.2	2,610
21	do	do	Lemoore road crossing near Lemoore, Cal.		[a] 80
Jan. 27	do	do	Highway bridge half a mile west of Stratford, Cal.		2,080
28	do	do	do		4,450
29	do	do	do		5,150
31	do	do	do		1,970
May 26	do	do	do		1,390
13	do	do	Empire weir, 1½ miles north of point discharge into Tulare Lake, Cal.	4.8	350
18	do	do	do	7.1	1,000
June 4	do	do	do	9.9	2,600
8	do	do	do	7.05	1,600
1915.					
June 7	Kings River (San Joaquin branch).	San Joaquin River	Wasteway of Crescent canal at north end of Summit Lake, Cal.	5.75	1,140
1914.					
Jan. 28	Kings River (San Jaoquin branch).	San Joaquin River	Three small highway bridges across the three branches at Elkhorn Grade, in sec. 3, T. 17 S., R. 18 E.	11.7	8,540
29	do	do	do	10.7	6,170
30	do	do	do	10.0	4,600
31	do	do	do	9.5	4,060
Apr. 19	do	do	do	4.6	1,070
21	do	do	do	5.8	1,620
23	do	do	do	6.4	1,850
May 26	do	do	do		4,510
June 3	do	do	do	11.16	6,420
4	do	do	do	11.36	6,620
July 6	do	do	do	9.75	3,710
1915.					
Mar. 2	Kings River (San Joaquin branch).	San Joaquin River	Three small highway bridges across the three branches at Elkhorn Grade, in sec. 3, T. 17 S., R. 18 E.	3.75	868
June 7	do	do	do	10.35	5,320
1914.					
Apr. 23	Murphy slough	Kings River	2 miles northwest of Riverdale, Cal.		215
24	Crescent canal	Diverts from Kings River.	New weir at head of canal		374
22	Zalda canal slough.	do	1,500 feet below Lemoore road, near Lemoore, Cal.	1.5	2,330
May 27	do	do	do		3,450

[a] Estimated by flood control division of department of engineering of State of California.

Miscellaneous discharge measurements in Pacific slope drainage basins for the year ending Sept. 30, 1915—Continued.

San Joaquin River basin.

Date.	Stream.	Tributary to—	Locality.	Gage height.	Discharge.
				Feet.	*Sec.-ft.*
1914. Apr. 21	Sand slough	Diverts from Zalda canal slough.	1½ miles south of Crescent weir, Cal.	....	496
1915. Sept. 21	San Joaquin and Kings River canal.	Diverts from San Joaquin River.	Head gate near Mendota, Cal., in NE. ¼ sec. 24, T. 13 S., R. 14 E.	9.09	559
21	Helm canal	.....do	Intake near Mendota, Cal., in NE. ¼ sec. 19, T. 13 S., R. 15 E.	....	14.9
21	Helm ditch	.....do	.....do	....	5.0
23	Temple slough	.....do	Head gate near Dos Palos, Cal., in SW. ¼ sec. 12, T. 11 S., R. 13 E.	1.45	74
24	East side canal	.....do	Head gate near Los Banos, Cal., in NE. ¼ sec. 17, T. 9 S., R. 12 E.	3.41	10.1
Aug. 21	Merced River	San Joaquin River	Top of Nevada Falls near Yosemite, Cal.	4.81	103
Sept. 28	.....do	.....do	.....do	3.90	20
1914. Nov. 9	Merced River	San Joaquin River	Above south fork at Clearing House, Cal.	....	76
10	.....do	.....do	Old U. S. G. S. gaging station, 2 miles above dam at Merced Falls, Cal.	....	107
1915. Aug. 21	Illilouette Creek	Merced River	Top of falls near Yosemite, Cal	4.45	18
Sept. 28	.....do	.....do	.....do	4.09	6.7
1914. Nov. 9	South Fork of Merced River.	Merced River	1,400 feet above mouth, near South Fork station, Cal.	....	35
1913. Oct. 22	South Fork of Merced River.	Merced River	500 feet above mouth		12
1915. Apr. 5	Corral Creek	Tuolumne River	At abandoned U. S. G. S. gaging station, 1 mile west of Jawbone, Cal.	.93	3.7
16	.....do	.....do	.....do	.82	2.7
21	Hazel Green Creek	South Fork of Tuolumne River.	Mouth, near Sequoia, Cal	....	2.1
July 7	Golden Rock ditch	Diverts from South Fork of Tuolumne River.	Above upper end of siphon near Hamilton, Cal.	....	9.3
7	.....do	.....do	Below waste gate, Coulterville road, near Hobern, Cal.	....	6.2
5	Golden Rock ditch (upper ditch).	Diverts from Middle Fork of Tuolumne River.	50 feet below head gate, in se. 5, T. 1 S., R. 20 E.	....	4.4
5	.....do	.....do	Upper cabin above Ackerson Meadow, Cal., in sec. 7, T. 1 S., R. 20 E.		4.6
5	.....do	.....do	Just below entrance of small tributary at northwest corner of sec. 18, T. 1 S., R. 20 E.	....	5.0

Sacramento River basin.

Date.	Stream.	Tributary to—	Locality.	Gage height.	Discharge.
1914. Jan. 15	Sacramento River	San Francisco Bay	Colusa, Cal	24.4	49,000
Mar. 2	.....do	.....do	.....do	20.1	40,600
1915. Feb. 11	Sacramento River	San Francisco Bay	Colusa, Cal	22.0	61,500
16	.....do	.....do	.....do	17.0	31,000
1914. Jan. 16	Sacramento River	San Francisco Bay	Meridian, Cal	49.8	39,800
1915. Feb. 4	Sacramento River	San Francisco Bay	Meridian, Cal	64.9	51,400
1914. Mar. 1	Sacramento River	San Francisco Bay	Above Tisdale weir, Cal	46.9	35,600
Feb. 28	.....do	.....do	Below Tisdale weir, Cal	47.1	22,500

Miscellaneous discharge measurements in Pacific slope drainage basins for the year ending Sept. 30, 1915—Continued.

Sacramento River basin—Continued.

Date.	Stream.	Tributary to—	Locality.	Gage height.	Discharge.
1915.				*Feet.*	*Sec.-ft.*
Jan. 19	Sacramento River.	San Francisco Bay	Knights Landing, Cal.	17.2	22,900
Feb. 5	do	do	do	18.9	17,300
1914.					
Jan. 27	Sacramento River.	San Francisco Bay	Sacramento, Cal.	27.7	76,300
Mar. 3	do	do	do	19.0	49,100
1915.					
Feb. 5	Sacramento River.	San Francisco Bay	Sacramento, Cal.	24.6	70,900
6	do	do	do	24.4	61,700
1908.					
Feb. 25	Fall River	Pit River	Whipple Bridge near Fall River Mills, Cal.	1.00	730
22	do	do	Glenburn Bridge near Fall River Mills, Cal.	.99	1,620
23	do	do	do	.99	1,620
26	do	do	Bill Neadys Bridge near Fall River Mills, Cal.	1.00	1,600
21	do	do	Town bridge at Fall River Mills, Cal.	1.00	1,520
26	do	do	do	1.00	1,570
27	Bear Creek	Fall River	Harden's ranch at bridge on Burtle road, Cal.		28
24	Tule River	do	Bridge above junction with Fall River, Cal.	1.00	940
1915.					
July 22	Hat Creek	Pit River	200 feet above upper big spring near Hat Creek, Cal.		39
24	do	do	do		41
22	do	do	1,200 feet below ranger station near Hat Creek, Cal.		195
24	do	do	do		198
24	do	do	500 feet below Hall ranch house near Hat Creek, Cal.		201
20	do	do	Bridge at Cassel, Cal.		359
20	do	do	do		362
21	Rising River	Hat Creek	600 feet below abandoned U. S. G. S. gaging station in sec. 8, T. 35 N., R. 4 E., 1¼ miles south of Cassel, Cal.	1.16	322
Apr. 21	Nelson Creek	Pit River	Half a mile above mouth, near Henderson, Cal.		388
Feb. 23	Colusa Basin	Sacramento River.	Outlet of basin, 2 miles north of Knights Landing, Cal.	40.8	20,200
24	do	do	do	40.7	21,000
25	do	do	do	40.7	20,200
26	do	do	do	40.7	19,500
1914.					
Jan. 9	Butte Slough	Sacramento River.	Mawson bridge, Cal.		38,600
17	do	do	Northern Electric Railroad bridge, Cal.		63,800
18	do	do	do		63,800
1915.					
Feb. 4	Butte Slough	Sacramento River.	Lone bridge on road between Marysville and Meridian, Cal.	9.04	174,000
12	do	do	do	4.8	35,700
1914.					
Mar. 2	Butte Slough	Sacramento River.	Mouth, at bridge on road between Meridian and Colusa, Cal.	58.04	6,630
1915.					
Feb. 10	Butte Slough	Sacramento River.	Mouth, at bridge on road between Meridian and Colusa, Cal.	59.6	8,560
1914.					
Jan. 18	Tisdale overflow	Diverts from Sacramento River.	Tisdale weir, Cal.	48.1	14,400
Feb. 28	do	do	do	47.2	15,000
21	Feather River	Sacramento River.	Yuba City, Cal.	16.0	75,000
1915.					
Feb. 9	Feather River	Sacramento River.	Northern Electric R. R. and highway bridge on road between Yuba City and Marysville, Cal.	7.46	19,600

Miscellaneous discharge measurements in Pacific slope drainage basins for the year ending Sept. 30, 1915—Continued.

Sacramento River basin—Continued.

Date.	Stream.	Tributary to—	Locality.	Gage height.	Discharge.
1915.				*Feet.*	*Sec.-ft.*
Mar. 12	Poplar Creek	Middle Fork of Feather River.	Mouth, near Sloat, Cal		19
May 15	Hydroelectric power plant flume.	Diverts from North Fork of North Fork of Yuba River.	Downieville, Cal		[a] 27
15	do	do	do		[b] 59
1914.					
Jan. 20	Yolo Basin	Sacramento River.	Sacramento & Woodland R. R. trestle, Cal.	27.7	101,000
Feb. 26	do	do	do	30.3	128,000
1915.					
Feb. 6	do	Sacramento River.	1½ miles south of Sacramento & Woodland R. R. trestle, Cal.	28.7	110,000
1914.					
Jan. 10	South Fork of Putah River.	Sacramento River.	Southern Pacific R. R. bridge, Cal		1,220
Feb. 24	Georgianna Slough.	do	Near Walnut Grove, Cal	8.7	12,100

Streams north of San Francisco Bay.

Date.	Stream.	Tributary to—	Locality.	Gage height.	Discharge.
1915.					
June 28	Williamson River.	Upper Klamath Lake.	Ball ranch, near head of Klamath Marsh, Oreg.	0.53	51.4
28	do	do	Rockyford, Oreg	[c] 1.96	113
May 16	Klamath River	Pacific Ocean	Orleans, Cal	5.6	12,700
June 28	Big Spring	Klamath Marsh	Below tributary, on Charles Lenz's ranch, in sec. 22, T. 30 S. R. 8 E., Oreg.		57.2
28	Sand Creek	do	Crescent road crossing, Oreg		24.0
1914.					
Oct. 27	Spring Creek	Williamson River.	Above rapids, near mouth, Oreg	1.00	337
1915.					
June 27	Spring Creek	Williamson River.	Above rapids, near mouth, Oreg	1.02	320
Sept. 20	North Fork of Sprague River.	do	Obenchain bridge, Oreg		42.7
20	Meryl Creek	North Fork Sprague River.	Above Obenchain ranch, Oreg		8.4
Aug. 6	Five-mile Creek	do	Above Hamaker ditch intake, Oreg		25.8
18	do	do	do		24.8
Jan. 22	Brown Creek	Sprague River	Bad crossing, in sec. 14, T. 36 S. R. 12 E., Oreg.		10.7
Feb. 26	do	do	do	.45	11.3
Mar. 19	Sycan River	do	Sec. 21, T. 32, S., R. 14 E., at ZX ranch above Sycan Marsh, Oreg.		31.0
20	Choctoot Creek	Sycan River	Sec. 10, T. 32 S., R. 14 E., Oreg		13.5
Feb. 26	Snake Creek	do	Choctoot ranch, Oreg		3.2
Jan. 24	Whiskey Creek	Sprague River	Near mouth, 5 miles east of Yainax, Oreg.	1.05	13.2
Feb. 26	do	do	do	1.55	27.4
Apr. 15	do	do	do	1.32	16.9
Jan. 21	Trout Creek	do	Saddle Mountain road crossing, Oreg	.80	2.1
Apr. 12	do	do	do	1.60	7.6
1914.					
Oct. 25	Kenocanal	Link River	Intake, near Klamath Falls, Oreg	1.04	201
1915.					
Sept. 14	Spencer Creek	Klamath River	Outlet of Buck Lake, Oreg		21.0
24	do	do	do		18.8
1914.					
Nov. 1	Fort Creek	Wood River	Near Fort Klamath, in sec. 26, T. 33 S., R. 7½ E., Oreg.	1.75	90.4

[a] Day load; 5 stamp mill.

[b] Night load; lighting.

[c] On gage at discontinued station above Spring Creek.

Miscellaneous discharge measurements in Pacific slope drainage basins for the year ending Sept. 30, 1915—Continued.

Streams north of San Francisco Bay—Continued.

Date.	Stream.	Tributary to—	Locality.	Gage height.	Discharge.
1915.				*Feet.*	*Sec.-ft.*
Feb. 17	Fort Creek	Wood River	Near Fort Klamath, in sec. 26, T. 33 S., R. 7½ E., Oreg.	1.54	87.2
June 25	.....do	.....do	.....do	1.53	86.9
July 31	.....do	.....do	.....do	1.55	89.0
Aug. 2	Crooked Creek	.....do	Sec. 13, T. 34 S., R. 7½ E., at Klamath Agency, Oreg.	1.08	81.3
2	.....do	.....do	.....do	.94	74.8
June 25	Agency Spring	Crooked Creek	In power canal, at Klamath Agency, Oreg.		22.3
Sept. 8	Reeve Davis Consolidated Mining Co.'s flume.	Diverts from Indian Creek.	Near Happy Camp, Cal., at old U. S. Geological Survey gaging station.		5.2
1914.					
Oct. 31	Supply Creek	Trinity River	Hoopa, Cal		8.9

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STREAM-GAGING STATIONS

AND

PUBLICATIONS RELATING TO WATER RESOURCES

PART XI. PACIFIC SLOPE BASINS IN CALIFORNIA

STREAM-GAGING STATIONS AND PUBLICATIONS RELATING TO WATER RESOURCES.

INTRODUCTION.

Investigation of water resources by the United States Geological Survey has consisted in large part of measurements of the volume of flow of streams and studies of the conditions affecting that flow, but it has comprised also investigation of such closely allied subjects as irrigation, water storage, water powers, ground waters, and quality of waters. Most of the results of these investigations have been published in the series of water-supply papers, but some have appeared in the annual reports, bulletins, professional papers, and monographs.

The results of stream-flow measurements are now published annually in 12 parts, each part covering an area whose boundaries coincide with natural drainage features as indicated below:

Part I. North Atlantic slope basins.
II. South Atlantic and eastern Gulf of Mexico basins.
III. Ohio River basin.
IV. St. Lawrence River basin.
V. Upper Mississippi River and Hudson Bay basins.
VI. Missouri River basin.
VII. Lower Mississippi River basin.
VIII. Western Gulf of Mexico basins.
IX. Colorado River basin.
X. Great Basin.
XI. Pacific slope basins in California.
XII. North Pacific slope basins, in three volumes:
    A, Pacific slope basins in Washington and upper Columbia River basin.
    B, Snake River basin.
    C, Lower Columbia River basin and Pacific slope basins in Oregon.

HOW GOVERNMENT REPORTS MAY BE OBTAINED OR CONSULTED.

Water-supply papers and other publications of the United States Geological Survey containing data in regard to the water resources of the United States may be obtained or consulted as indicated below:

1. Copies may be obtained free of charge by applying to the Director of the Geological Survey, Washington, D. C. The edition printed for free distribution is, however, small and is soon exhausted.

Numbers of water-supply papers containing results of stream measurements, 1899–1915.

Year.	I	II	III	IV	V	VI	VII	VIII	IX	X	XI	XII		
												North Pacific slope basins.		
	North Atlantic slope basins (St. John River to York River).	South Atlantic slope and eastern Gulf of Mexico basins (James River to the Mississippi).	Ohio River basin.	St. Lawrence River basin.	Hudson Bay and upper Mississippi River basins.	Missouri River basin.	Lower Mississippi River basin.	Western Gulf of Mexico basins.	Colorado River basin.	Great Basin.	Pacific slope basins in California.	Pacific slope basins in Washington and upper Columbia River basin.	Snake River basin.	Lower Columbia River basin and Pacific slope basins in Oregon.
1899 a.....	35	b 35, 36	36	36	36	c 36, 37	37	37	d 37, 38	38, e 39	38, f 39	38	38	38
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		242	243	244	245	246	247	248	249	250, r 251	251	252	252	252
		262	263	264	265	266	267	268	269	270, r 271	271	272	272	272
		282	283	284	285	286	287	288	289	290	291	292	292	292
		302	303	304	305	306	307	308	309	310	311	312	312	312
		322	323	324	325	326	327	328	329	330	331	332–A	332–B	332–C
		352	353	354	355	356	357	358	359	360	361	362–A	362–B	362–C
		382	383	384	385	386	387	388	389	390	391	392	393	394
		402	403	404	405	406	407	408	409	410	411	412	413	414

[illegible] Water-Supply Papers 35–39 contained in Water-Supply [illegible] for 1899 in Twenty-first Annual Report, Part IV.

[illegible] junction with Gunnison.

[illegible] and Grand River above [illegible]

[illegible] Pacific slope drainage basins [illegible] 47–52 and data on precipitation [illegible] Water-Supply Paper 52, [illegible]

[illegible] in California and Utah contained [illegible] for 1900 in Twenty-second Annual Report, Part IV.

[illegible] Schuylkill rivers to James River.

[j] Loup and Platte rivers near Columbus, Nebr., and all tributaries below junction with Platte.

[k] Tributaries of Mississippi from east.

[l] Lake Ontario and tributaries to St. Lawrence River proper.

[m] Hudson Bay only.

[n] New England rivers only.

[o] Hudson River to Delaware River, inclusive.

[p] Susquehanna River to Yadkin River, inclusive.

[q] Platte and Kansas rivers.

[r] Great Basin in California, except Truckee and Carson river basins.

[s] Below junction with Gila.

[t] Rogue, Umpqua, and Siletz rivers only.

PRINCIPAL STREAMS.

The rivers draining into the Pacific Ocean from California include San Diego, San Dieguito, San Luis Rey, Santa Ana, San Gabriel, Los Angeles, Santa Ynez, Santa Maria, and Salinas rivers, draining areas south of San Francisco Bay; San Joaquin River, whose chief tributaries are Kings, Merced, Tuolumne, Stanislaus, Calaveras, and Mokelumne rivers; Sacramento River, whose principal tributaries are Pit, Feather, and American rivers; and Russian, Eel, Mad, Klamath, and Smith rivers, which flow into the ocean north of San Francisco Bay. Except Klamath River, which receives the drainage from a small area in Oregon, and a few streams in Oregon that flow into Goose Lake, at the head of Pit River, all the streams in this division are entirely in California.

In addition to the list of gaging stations and the annotated list of publications relating specifically to the section, these pages contain a similar list of reports that are of general interest in many sections and cover a wide range of hydrologic subjects, and also brief references to reports published by State and other organizations. (See p. xxiii.)

GAGING STATIONS.

NOTE.—Dash following a date indicates that the station was being maintained September 30, 1915; period after date indicates discontinuance.

DRAINAGE BASINS SOUTH OF SAN FRANCISCO BAY.

Tia Juana River near Nestor, Cal., 1915.
    Cottonwood Creek near Dulzura, Cal., 1906–1915.
        Dulzura conduit near Dulzura, Cal, 1909–1915.
        Pine Valley Creek near Jamul, Cal., 1906–1908.
Sweetwater River near Descanso, Cal., 1905–
Sweetwater River near Dehesa, Cal., 1913–
San Diego River at diverting dam, near Lakeside, Cal., 1912–
San Diego River at Lakeside, Cal., 1905–
San Diego River near Santee, Cal., 1912–
San Diego River near San Diego, Cal., 1912–
    Boulder Creek at Cuyamaca reservoir, near Julian, Cal., 1912–
    Boulder Creek at mouth, near Lakeside, Cal., 1912–
    San Diego flume at diverting dam, near Lakeside, Cal., 1913–
    San Diego flume near Lakeside, Cal., 1907–
    South Fork of San Diego River near Alpine, Cal., 1913–1915.
    South Fork flume near Alpine, Cal., 1913–1915.
    San Vincente Creek at Foster, Cal., 1915.
Santa Ysabel Creek (head of San Dieguito River) near Santa Ysabel, Cal., 1913–1915.
Santa Ysabel Creek near Mesa Grande, Cal., 1912–
Santa Ysabel Creek near Ramona, Cal., 1912–
Santa Ysabel Creek near Escondido, Cal., 1905–1912.
San Dieguito River at Bernardo, Cal., 1912–
San Dieguito River near Del Mar, Cal., 1913–14.
    Black Canyon Creek near Mesa Grande, Cal., 1913–1915.
    Temescal Creek near Almond, Cal., 1913–1915.

- San Dieguito River tributaries—Continued.
    - Guejito Creek near Escondido, Cal., 1915.
    - East San Pasqual ditch near Escondido, Cal., 1912–1914.
    - West San Pasqual ditch near Escondido, Cal., 1912–1915.
    - Santa Maria Creek near Ramona, Cal., 1912–
- San Luis Rey River near Warner Springs, Cal., 1913–1915.
- San Luis Rey River near Mesa Grande, Cal., 1911–
- San Luis Rey River near Nellie, Cal., 1915–
- San Luis Rey River at diversion flume, 1894–1899.
- San Luis Rey River near Pala, Cal., 1903–
- San Luis Rey River at Pala, Cal., 1912.
- San Luis Rey River at Bonsall, Cal., 1912–
- San Luis Rey River near Oceanside, Cal., 1912–1915.
    - Agua Caliente Creek near Warner Springs, Cal., 1913–1915.
    - Canada Verde Creek near Warner Springs, Cal., 1913–1915.
    - West Fork of San Luis Rey River near Warner Springs, Cal., 1913–1915.
    - Carrizo Creek near Warner Springs, Cal., 1913–1915.
    - Susanna Creek near Warner Springs, Cal., 1913–1915.
    - Matagual Creek near Warner Springs, Cal., 1912–1915.
    - Escondido Mutual Water Co.'s canal near Nellie, Cal., 1896–
    - Rincon Indian Reservation ditch near Valley Center, Cal., 1912.
    - Pala Indian Reservation canal at Pala, Cal., 1912–13.
    - San Luis Rey ditch near San Luis Rey, Cal., 1913.
- Temecula Creek (head of Santa Margarita River) near Temecula, Cal., 1905–6.
- Santa Ana River near Mentone, Cal., 1896–
    - Pacific Light & Power Corporation's canal and Greenspot pipe line near Mentone, Cal. 1896–
    - Highlands or North Fork canal at intake weir, San Bernardino County, Cal., 1896–1904.
    - Redlands or South Fork canal at sand box weir, San Bernardino County, Cal., 1896–1904.
    - Mill Creek in canyon, near headworks of Crafton canal, Cal., 1896–1905.
    - Mill Creek at Forest Home, Cal., 1903–
    - Waterman Canyon Creek near San Bernardino, Cal., 1911–1914.
    - Devil Canyon Creek near San Bernardino, Cal., 1911–1914.
    - Lytle Creek at mouth of canyon, near San Bernardino, Cal., 1894–1901; 1904–
    - Temescal Creek near Rincon, Cal., 1899.
        - Coldwater Creek above dam, Riverside County, Cal., 1899.
    - San Antonio Creek near Upland, Cal., 1901–
- San Gabriel River above Fish Fork, near Azusa, Cal., 1900–1901; 1910; 1912. (Low-water records.)
- San Gabriel River at headworks near Azusa, Cal., 1812–1914.
- San Gabriel River near Azusa, Cal., 1894–
    - Pacific Light & Power Corporation's canal near Azusa, Cal., 1896–
    - West Branch of North Fork of San Gabriel River at weir, 1900.
    - North Branch of North Fork of San Gabriel River at weir, 1900.
    - West Fork of San Gabriel River above North Fork, Cal., 1900.
    - Coldwater Creek at weir above mouth, 1900.
    - Fish Fork of San Gabriel River near Azusa, Cal., 1900–1901; 1910; 1912. (Low-water record.)
    - Iron Fork of San Gabriel River near Azusa, Cal., 1900–1901; 1910; 1912. (Low-water record.)
- Los Angeles River at Los Angeles, Cal., 1896–1900.
    - Arroyo Seco near Pasadena, Cal., 1910–

Malibu Creek near Calabasas, Cal., 1903-1906.
    Triunfo Creek near Calabasas, Cal., 1903-1906.
Santa Clara River at Fillmore, Cal., 1911-12.
    Piru Creek near Piru, Cal., 1911-1913.
    Sespe Creek at Sespe, Cal., 1911-1913.
    Santa Paula Creek near Santa Paula, Cal., 1911-1913.
Ventura River near Nordhoff, Cal., 1911-1914.
Ventura River near Ventura, Cal., 1911-1914.
San Roque Creek, Santa Barbara County, Cal., 1890.
San Jose Creek, Santa Barbara County, Cal., 1890.
Loma Abajo River, Santa Barbara County, Cal., 1890.
Gato Creek at mouth, Santa Barbara County, Cal., 1890.
Santa Ynez River near Santa Barbara, Cal., 1903-1908; 1910-
Santa Ynez River near Lompoc, Cal., 1906-
    Mono Creek at Mono dam site, near Santa Barbara, Cal., 1902-1904.
Santa Maria River near Santa Maria, Cal., 1903-1906.
Salinas River near Salinas, Cal., 1900-1901.
    Nacimiento Creek near Bryson, Cal., 1901.
    San Antonio River near Jolon, Cal., 1900-1901.
    San Lorenzo Creek near King City, Cal., 1900-1903; 1912.
    Arroyo Seco near Soledad, Cal., 1901-
Pajaro River at Watsonville, Cal., 1911-1914.

SAN FRANCISCO BAY.

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Coyote River near Madrone, Cal., 1902-1912.
Alameda Creek at Sunolglen, Cal., 1900-
Spring Valley Water Co.'s aqueduct near Sunolglen, Cal., 1903-

KERN RIVER BASIN.

Kern River near Kernville, Cal., 1912-
Kern River at Kernville, Cal., 1905-1912.
Kern River at Isabella, Cal., 1910-1912.
Kern River at Rio Bravo ranch, Cal., 1878-1884.
Kern River near Bakersfield, Cal., 1894-
    Kern River Power Co.'s canal at Kernville, Cal., 1910-1914.
    South Fork of Kern River near Onyx, Cal., 1911-1914.
    South Fork of Kern River at Isabella, Cal., 1910-1913.
    Erskine Creek near Bodfish, Cal., 1911-
    Caliente Creek at base of foothills, Kern County, Cal., 1878-1884.
        Basin Creek near Havilah, Cal., 1911-1913.
    Tejon House Creek at Tejon ranch house, Cal., 1895-96.
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Poso Creek at base of foothills, Kern County, Cal., 1878-1884.
White River at base of foothills, Tulare County, Cal., 1878-1884.
White River near Hot Springs, Cal., 1911-1913.
Deer Creek at base of foothills, Tulare County, Cal., 1878-1884.
Deer Creek at Hot Springs, Cal., 1910-
    Tyler Creek near Hot Springs, Cal., 1911-1913.
Tule River, North Fork of Middle Fork, near Springville, Cal., 1909-1913.
Tule River near Portersville, Cal., 1901-

- Tule River at Portersville, Cal., 1878–1884.
  - South Fork of Middle Fork of Tule River near Springville, Cal., 1909–1913.
  - Bear Creek near Springville, Cal., 1911–
  - South Fork of Tule River near Portersville, Cal., 1910–
- Kaweah River, Middle Fork, near Hammond, Cal., 1913.
- Kaweah River at Wachumna Hill, Cal., 1878–1884.
- Kaweah River near Three Rivers, Cal., 1911–
  - Marble Fork of Kaweah River near Ranger, Cal., 1913.
  - East Fork of Kaweah River near Hammond, Cal., 1913.
  - North Fork of Kaweah River near Kaweah, Cal., 1913.
  - North Fork of Kaweah River at Kaweah, Cal., 1910-
  - South Fork of Kaweah River near Three Rivers, Cal., 1911–
- Kings River at Suspension Bridge, Cal., 1895.
- Kings River near Sanger, Cal., 1895–
- Kings River at Slate Point, Cal., 1878–1884.
- Kings River at Kingsburg, Cal., 1891–1904.
  - Dinkey Creek near Ockenden, Cal., 1910–1915.
  - Big Creek near Tollhouse, Cal., 1911–1914.
    - Rush Creek near Ockenden, Cal., 1910–1913.

SAN JOAQUIN RIVER BASIN.

- San Joaquin River near Shaver, Cal., 1912–1915.
- San Joaquin River near North Fork, Cal., 1910–1914.
- San Joaquin River near Friant, Cal., 1907–
- San Joaquin River near Hamptonville, Cal., 1878–1884.
- San Joaquin River at Herndon, Cal., 1891–1909.
- San Joaquin River near Newman, Cal., 1912–
  - Big Creek near Big Creek, Cal., 1910–1915.
    - Pitman Creek at Big Creek, Cal., 1910–1915.
  - North Fork Creek near North Fork, Cal., 1910–11.
    - Crane Valley reservoir near North Fork, Cal., 1910–1915.
    - Evaporation from Crane Valley reservoir near North Fork, Cal., 1910–1915.
    - South Fork Creek near North Fork, Cal., 1910–1915.
      - South Fork ditch near North Fork, Cal., 1910; 1913.
    - Whiskey Creek near North Fork, Cal., 1910–1915.
      - Cascadel Creek near North Fork, Cal., 1910–1912.
  - Fresno River at base of foothills, Madera County, Cal., 1878–1884.
  - Fresno River near Knowles, Cal., 1911–1914.
    - Nelder Creek near Fresno Flats, 1910–1912.
    - North Fork of Fresno River near Sugar Pine, Cal., 1910–1912.
  - Chowchilla Creek at base of foothills, near Buchanan, Cal., 1878–1884.
  - Mariposa Creek at base of foothills, Mariposa County, Cal., 1878–1884.
  - Bear Creek at base of foothills, Merced County, Cal., 1878–1884.
  - Merced River above Illilouette Creek, near Yosemite, Cal., 1915.
  - Merced River at Happy Isles Bridge, near Yosemite, Cal., 1915–
  - Merced River at Yosemite, Cal., 1904–1909; 1912–
  - Merced River near Merced Falls, Cal., 1901–1913.
  - Merced River at Merced Falls, Cal., 1878–1884.
  - Merced River near Newman, Cal., 1912.
    - Illilouette Creek near Yosemite, Cal., 1915.
    - Tenaya Creek near Yosemite, Cal., 1904–1909; 1912–
    - Yosemite Creek at Yosemite, Cal., 1904–1909; 1912–
    - South Fork of Merced River near Wawona, Cal., 1910–
      - Big Creek near Wawona, Cal., 1910–11.

- San Joaquin River—Continued.
  - Tuolumne River at Hetch Hetchy cabin, near Sequoia, Cal., 1910–
  - Tuolumne River at Hetch Hetchy dam site, near Sequoia, Cal., 1901; 1910–1915.
  - Tuolumne River below Hetch Hetchy dam site, near Sequoia, Cal., 1915–
  - Tuolumne River near Groveland, Cal., 1907–
  - Tuolumne River above La Grange dam, near La Grange, Cal., 1915–
  - Tuolumne River near La Grange, Cal., 1895–
  - Tuolumne River at Modesto, Cal., 1878–1884; 1891–1897.
    - Cherry Creek near Sequoia, Cal., 1901; 1910–
      - Eleanor Creek near Sequoia, Cal., 1901; 1909–
      - Evaporation from Lake Eleanor near Sequoia, Cal., 1915–
    - Jawbone Creek near Tuolumne, Cal., 1910–1915.
    - Corral Creek near Groveland, Cal., 1910–1913.
    - South Fork of Tuolumne River near Sequoia, Cal., 1914–
    - South Fork of Tuolumne River near Groveland, Cal., 1910–
      - Golden Rock ditch near Sequoia, Cal., 1914–
    - Clavey River near Tuolumne, Cal., 1910–1913.
      - Indian Creek near Tuolumne, Cal., 1910–11.
    - North Fork of Tuolumne River near Tuolumne, Cal., 1910–11.
      - Hunter Creek near Tuolumne, Cal., 1910–1913.
    - La Grange [Yosemite] Water & Power Co.'s canal near La Grange, Cal., 1908–
    - Modesto canal near La Grange, Cal., 1903–
    - Turlock canal near La Grange, Cal., 1899–
  - Stanislaus River, Middle Fork, at Sand Bar Flat, near Avery, Cal., 1905–
  - Stanislaus River at Knights Ferry, Cal., 1903–
  - Stanislaus River at Oakdale, Cal., 1878–1884; 1895–1900.
    - Relief reservoir near Baker Station, Cal., 1910–
    - Relief Creek near Baker Station, Cal., 1910–
    - North Fork of Stanislaus River near Avery, Cal., 1914–
    - Utica Gold Mining Co.'s canal near Avery, Cal., 1914–
    - Rose Creek near Jupiter, Cal., 1910–1913.
      - Knight Creek near Jupiter, Cal., 1910–1913.
    - South Fork of Stanislaus River at Strawberry, Cal., 1911–
    - South Fork of Stanislaus River near Columbia, Cal., 1910–1913.
    - South San Joaquin canal near Knights Ferry, Cal., 1914–
    - Oakdale canal near Knights Ferry, Cal., 1914–
    - Stanislaus & San Joaquin Water Co.'s canal at Knights Ferry, Cal., 1904–1913.
  - Calaveras River at Jenny Lind, Cal., 1907–
  - Calaveras River near Bellota, Cal., 1878–1884.
  - Mokelumne River at Electra, Cal., 1901; 1903–4.
  - Mokelumne River at Lone Star Mill, Cal., 1878–1884.
  - Mokelumne River near Clements, Cal., 1904–
  - Mokelumne River at Lodi, Cal., 1891–1895.
    - Middle Fork of Mokelumne River at West Point, Cal., 1911–
    - South Fork of Mokelumne River near Railroad Flat, Cal., 1911–
      - Licking Fork of Mokelumne River near Railroad Flat, Cal., 1911–
    - Dry Creek near Ione, Cal., 1911–12.
    - Dry Creek at base of foothills, San Joaquin County, Cal., 1878–1884.
    - Cosumnes River, North Fork, near Pleasant Valley, Cal., 1906–7.
    - Cosumnes River, North Fork, near Eldorado, Cal., 1911–
    - Cosumnes River at Michigan Bar, Cal., 1907–
    - Cosumnes River below Michigan Bar, Cal., 1878–1884.
      - Sly Park Creek at Park, Cal., 1906.

GOOSE LAKE BASIN.

- Drews Creek reservoir near Lakeview, Oreg., 1913–
- Drews Creek near Lakeview, Oreg., 1909–
  - Dog Creek near Lakeview, Oreg., 1912–13.
  - North Drews canal near Lakeview, Oreg., 1914–
- Cottonwood Creek near Lakeview, Oreg., 1908–
  - Thomas Creek near Lakeview, Oreg., 1912–

SACRAMENTO RIVER BASIN.

- Sacramento River at Castella, Cal. 1910–
- Sacramento River at Antler, Cal., 1910–11.
- Sacramento River at Jellys Ferry, Cal., 1895–1902.
- Sacramento River near Red Bluff, Cal., 1902–
- Sacramento River at Red Bluff, Cal., 1894–1896.
- Sacramento River at Collinsville, Cal., 1878–1885.
  - Pit River near Canby, Cal., 1904–5.
  - Pit River near Bieber, Cal., 1904–1908; 1913–14.
  - Pit River at Henderson, Cal., 1910–
  - Pit River near Ydalpom, Cal., 1910–
    - South Fork of Pit River near Ivy, Cal., 1904–5.
      - West Valley Creek near Likely, Cal., 1904–5.
    - Ash Creek at Adin, Cal., 1904–5.
    - Fall River at Fall River Mills, Cal., 1912–13.
    - Hat Creek at Hawkin's ranch, near Hat Creek, Cal., 1911–1913.
    - Hat Creek at Hat Creek, Cal., 1910–
      - Rising River near Cassel, Cal., 1911–1914.
    - Burney Creek near Burney, Cal., 1911–1913.
    - Kosk Creek near Henderson, Cal., 1910–
    - Montgomery Creek at Montgomery Creek, Cal., 1911–1913.
    - Squaw Creek near Ydalpom, Cal., 1911–1913.
    - McCloud River near Gregory, Cal., 1902–1908.
    - McCloud River at Baird, Cal., 1910–
  - Clear Creek near Shasta, Cal., 1911–1913.
  - Cow Creek at Millville, Cal., 1911–1914.
    - Clover Creek at Millville, Cal., 1911–1914.
    - Little Cow Creek at Palo Cedro, Cal., 1911–1914.
  - Bear Creek near Millville, Cal., 1911–1914.
  - North Fork of Cottonwood Creek at Ono, Cal., 1907–1914.
  - Mill Creek near Los Molinos, Cal., 1909–1913.
  - Deer Creek near Vina, Cal., 1911–1915.
  - Stony Creek near Stonyford, Cal., 1913–1914.
  - Stony Creek near Fruto, Cal., 1901–1912.
    - Little Stony Creek near Lodoga, Cal., 1907–
  - Feather River, North Fork, above Prattville, Cal., 1905–1907.
  - Feather River, North Fork, near Prattville, Cal., 1905–
  - Feather River, North Fork, at Big Bar, Cal., 1911–
  - Feather River, North Fork, at Big Bend, Cal., 1905–1910.
  - Feather River at Oroville, Cal., 1902–
    - Hamilton Branch near Prattville, Cal., 1905–1907.
    - Butt Creek at Butte Valley, Cal., 1905–
    - Indian Creek near Crescent Mills, Cal., 1906–1909; 1911–
      - Spanish Creek at Keddie, Cal., 1911–

- Sacramento River tributaries—Continued.
  - Feather River tributaries—Continued.
    - Middle Fork of Feather River near Cromberg, Cal., 1910–
    - Middle Fork of Feather River near Oroville, Cal., 1911–
      - Grizzly Creek near Beckwith, Cal., 1905–6.
    - South Fork of Feather River at Enterprise, Cal., 1911–
      - Palermo Land & Water Co.'s canal at Enterprise, Cal., 1911–
  - Yuba River, Middle Fork, near North San Juan, Cal., 1900; 1910–
  - Yuba River at Smartsville, Cal., 1903–
  - Yuba River at Parks Bar bridge, near Smartsville, Cal., 1900.
    - Oregon Creek near North San Juan, Cal., 1910–
    - North Fork of Yuba River near Sierra City, Cal., 1911–1913.
      - North Fork of Yuba River at Goodyear Bar, Cal., 1910–
      - North Fork of Yuba River near North San Juan, Cal., 1900.
        - North Fork of North Fork of Yuba River at Downieville, Cal., 1910–
        - Rock Creek at Goodyear Bar, Cal., 1910–
        - Goodyear Creek at Goodyear Bar, Cal., 1910–
    - Bear River near Colfax, Cal., 1911–
    - Bear River at Van Trent, Cal., 1904–
      - Bear River canal near Colfax, Cal., 1911–
  - American River, North Fork, near Colfax, Cal., 1911–
  - American River at Fairoaks, Cal., 1904–
    - Middle Fork of American River near East Auburn, Cal., 1911–
      - Rubicon River at Rubicon Springs, Cal., 1910–1914.
      - Rubicon River near Quintette, Cal., 1909–1914.
        - Little Rubicon River near Rubicon Springs, Cal., 1910–11.
        - Little South Fork of Rubicon River at sawmill near Quintette, Cal., 1910–1914.
        - Little South Fork of Rubicon River below Gerle Creek near Quintette, Cal., 1910–1914.
        - Little South Fork of Rubicon River at mouth, near Quintette, Cal., 1909–1911.
          - Gerle Creek near Rubicon Springs, Cal., 1910–1914.
          - Little South Fork ditch at sawmill near Quintette, Cal., 1910,–1913.
        - Pilot Creek near Quintette, Cal., 1910–1914.
          - Pilot Creek ditch near Quintette, Cal., 1910–1914.
    - South Fork of American River at Kyburz, Cal., 1906–7.
    - South Fork of American River near Kyburz, Cal., 1906.
    - South Fork of American River below Kyburz, Cal., 1907.
    - South Fork of American River near Placerville, Cal., 1911–
  - Clear Lake at Lakeport, Cal., 1874–1900; 1913–
  - Cache Creek at Lower Lake, Cal., 1901–1915.
  - Cache Creek at Yolo, Cal., 1903–
  - Putah Creek near Guenoc, Cal., 1904–1906.
  - Putah Creek at Winters, Cal., 1905–

DRAINAGE BASINS NORTH OF SAN FRANCISCO BAY.

RUSSIAN RIVER BASIN.

- Russian River near Ukiah, Cal., 1911–1913.
- Russian River at Geyserville, Cal., 1910–1913.
  - East Fork of Russian River near Ukiah, Cal., 1911–1913.

MATTOLE RIVER BASIN.

- Mattole River near Petrolia, Cal., 1911–1913.

EEL RIVER BASIN.

- South Eel River at Hearst, Cal., 1910–1913.
- Eel River at Two Rivers, Cal., 1911–1913.
- Eel River at Scotia, Cal., 1910–1915.
  - Middle Eel River near Covelo, Cal., 1911–
  - South Fork of Eel River at Garberville, Cal., 1911–1913.
  - Van Duzen River at Bridgeville, Cal., 1911–1913.
    - Yager Creek at Carlotta, Cal., 1911–1914.

MAD RIVER BASIN.

- Mad River near Arcata, Cal., 1910–1913.

REDWOOD CREEK BASIN.

- Redwood Creek near Korbel, Cal., 1911–1913.
- Redwood Creek at Orick, Cal., 1911–1913.

KLAMATH RIVER BASIN.

- Williamson River (head of Klamath River) above Spring Creek, near Chiloquin, Oreg., 1908–1910; 1912–13.
- Williamson River at Chiloquin, Oreg., 1911–
- Upper Klamath Lake near Klamath Falls, Oreg., 1904; 1906–
- Link River at Klamath Falls, Oreg., 1904–
- Klamath River below Klamath Falls, Oreg., 1907–1909.
- Klamath River at Keno, Oreg., 1904–1913.
- Klamath River at Spencer Bridge, near Keno, Oreg., 1914–
- Klamath River near Seiad Valley, Cal., 1912–
- Klamath River near Happy Camp, Cal., 1911–12.
- Klamath River near Requa, Cal., 1910–
  - Miller Creek near Crescent, Oreg., 1911–1914.
  - Sprague River near (above) Yainax, Oreg., 1912–
  - Sprague River near (below) Yainax, Oreg., 1904.
  - Sprague River at Chiloquin, Oreg., 1911–
    - Sycan River near Silverlake, Oreg., 1905–6.
    - Sycan River near Yainax, Oreg., 1911–
    - Modoc Point canal at Chiloquin, Oreg., 1915–
  - Wood River at Fort Klamath, Oreg., 1911–
    - Anna Creek at Crater Lake post office, Oreg., 1913.
  - Fourmile Creek near Odessa, Oreg., 1912–
  - "A" canal at Klamath Falls, Oreg., 1911–
  - Lost River near Clear Lake, Cal., 1904–1909.
  - Lost River above Olene, Oreg., 1915–
  - Lost River at Olene, Oreg., 1904; 1907–1912.
  - Lost River at Wilson Bridge near Olene, Oreg., 1912–
  - Lost River near Merrill, Oreg., 1904–1909.
    - Lost River diversion canal near Olene, Oreg., 1912–
    - Tule Lake near Merrill, Oreg., 1904–
    - Miller Creek near Lorella, Oreg., 1909–
    - Olene wasteway at Olene, Oreg., 1915–
    - "G" canal[1] at Lost River dam near Olene, Oreg., 1913–

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[1] Formerly called Griffith lateral

Klamath River tributaries—Continued.
- Lower Klamath Lake near Brownell, Cal., 1907-1909; 1912-
- Shasta River near Montague, Cal., 1911-1913.
- Scott River, East Fork, near Callahan, Cal., 1910-1913.
- Scott River, East Fork, at Callahan, Cal., 1913-
- Scott River at Callahan, Cal., 1911-
- Scott River near Scott Bar, Cal., 1911-1913.
- Indian Creek near Happy Camp, Cal., 1911-
  - Reeve Davis flume near Happy Camp, Cal., 1911-1913.
- Salmon River at Somesbar, Cal., 1911-1915.
- Trinity River near Trinity Center, Cal., 1910-1913.
- Trinity River at Lewiston, Cal., 1911-1914.
- Trinity River near China Flat, Cal., 1911-1913.
- Trinity River at Hoopa, Cal., 1911-1914.
    - Coffee Creek at Coffee, Cal., 1910-1914.
    - East Fork of Trinity River near Trinity Center, Cal., 1910-1914.
    - Swift Creek near Trinity Center, Cal., 1910-1914.
    - North Fork of Trinity River at Helena, Cal., 1911-1914.
    - South Fork of Trinity River near China Flat, Cal., 1911-1913.
- Smith River, Middle Fork, near Crescent City, Cal., 1911-
  - North Fork of Smith River near Crescent City, Cal., 1911-
  - South Fork of Smith River near Crescent City, Cal., 1911-1913.

REPORTS ON WATER RESOURCES OF PACIFIC SLOPE BASINS OF CALIFORNIA.

PUBLICATIONS OF UNITED STATES GEOLOGICAL SURVEY.

WATER-SUPPLY PAPERS.

Water-supply papers are distributed free by the Geological Survey as long as its stock lasts. An asterisk (*) indicates that this stock has been exhausted. Many of the papers marked in this way may, however, be purchased (at price noted) from the SUPERINTENDENT OF DOCUMENTS, WASHINGTON, D. C. Omission of the price indicates that the report is not obtainable from Government sources. Water-supply papers are of octavo size.

*17. Irrigation near Bakersfield, Cal., by C. E. Grunsky. 1898. 96 pp., 16 pls.

*18. Irrigation near Fresno, Cal., by C. E. Grunsky. 1898. 94 pp., 14 pls.

*19. Irrigation near Merced, Cal., by C. E. Grunsky. 1899. 59 pp., 11 pls.

Water-Supply Papers 17, 18, and 19 discuss the development of irrigation in the San Joaquin Valley, outline physiographic features, and give history of the various irrigation districts. Chiefly of historic interest as indicated by dates of publication.

*43. Conveyance of water in irrigation canals, flumes, and pipes, by Samuel Fortier. 1901. 86 pp., 15 pls. 15c.

Describes the location and construction of various types of canals for irrigation.

*44. Profiles of rivers in the United States, by Henry Gannett. 1901. 100 pp., 11 pls. 15c.

Gives elevations and distances along Sacramento, Pit, Feather, Yuba, American, Cosumnes, Mokelumne, Calaveras, Tuolumne, and Klamath rivers, Cal.

*45. Water storage on Cache Creek, Cal., by A. E. Chandler. 1901. 48 pp., 10 pls. 15c.

Discusses topography, precipitation, stream measurements, ground waters, and irrigation works in Cache Creek basin; includes description of Clear Lake.

46. Physical characteristics of Kern River, Cal., by F. H. Olmsted, and Reconnaissance of Yuba River, Cal., by Marsden Manson. 1901. 57 pp., 8 pls. 10c.

Describes topography of Kern River basin, gives estimates of daily and monthly discharge, and discusses possible utilization of storage sites and development of power. The second paper in the report gives similar data for Yuba River.

*57. Preliminary list of deep borings in the United States, Part I (Alabama-Montana), by N. H. Darton. 1902. 60 pp. (See No. 149.) 5c.

Contains information as to depth, diameter, yield, and head of water in borings more than 400 feet deep; under head "Remarks" gives information concerning temperature, quality of water, purposes of boring, etc.

*58. Storage of water on Kings River, Cal., by J. B. Lippincott. 1902. 101 pp., 32 pls. 15c.

Discusses physical features, rainfall, stream flow, evaporation and seepage, and power development; includes chapter (by Lewis A. Hicks) on the generation and transmission of electric power and installation of pumping plants.

*59. Development and application of water near San Bernardino, Colton, and Riverside, Cal., Part I, by J. B. Lippincott. 1902. 95 pp., 11 pls.

*60. Development and application of water near San Bernardino, Colton, and Riverside, Cal., Part II, by J. B. Lippincott. 1902. 45 pp. (97-141), 15c.

Nos. 59 and 60 describe topography, soil, climate, crops, canals, wells, and pumping plants; discuss briefly the manufacture of Portland cement in southern California.

*81. California hydrography, by J. B. Lippincott. 1903. 488 pp., 1 pl. 25c.

A collection of published records of stream flow "hitherto much scattered, some of them out of print and difficult to secure," brought together as a book of reference for engineers a irrigators.

86. Storage reservoirs on Stony Creek, Cal., by Burt Cole. 1903. 62 pp., 16 pls. 15c.

Discusses briefly water supply of Glenn County as related to population and industry, irrigation districts, the proposed Stony Creek forest reserve, and storage sites on Grindstone, Salt, Briscoe, and Stony creeks.

89. Water resources of the Salinas Valley, Cal., by Homer Hamlin. 1904. 91 pp., 12 pls. 15c.

Describes briefly the geography, topography, general and economic geology, climate, water supply, and irrigation of the Salinas Valley.

*103. A review of the laws forbidding pollution of inland waters in the United States, by E. B. Goodell. 1904. 120 pp. Superseded by 152.

Cites statutory restriction of water pollution in California.

*112. Underflow tests in the drainage basin of Los Angeles River, by Homer Hamlin. 1905. 55 pp., 7 pls. 5c.

Discusses conditions under which ground water occurs in arid regions, and fluctuations in water level; describes machinery and methods used in sinking test wells and the results obtained at each station.

116. Water problems of Santa Barbara, Cal., by J. B. Lippincott. 1905. 99 pp., 8 pls. 10c.

Reviews earlier work in Santa Barbara region and describes near-by and distant water supplies, including Ventura and Santa Ynez rivers; discusses the quality of the water of the Santa Ynez (giving analyses) and the available reservoir sites.

122. Relation of the law to underground waters, by D. W. Johnson. 1905. 55 pp. 5c.

Cites legislative acts relating to ground waters in California.

*137. Development of underground waters in the eastern coastal-plain region of southern California, by W. C. Mendenhall. 1905. 140 pp., 7 pls. 35c.

*138. Development of underground waters in the central coastal-plain region of southern California, by W. C. Mendenhall. 1905. 162 pp., 5 pls. 25c.

*139. Development of underground waters in the western coastal-plain region of southern California, by W. C. Mendenhall. 1905. 105 pp., 8 pls. 25c.

Three reports discussing the topography, crops, irrigation systems, and wells, and the effects of development and drought on changes in ground-water level. The area covered by these reports includes the Anaheim, Santa Ana, Downey, Las Bolsas, Santa Monica, and Redondo quadrangles in Orange and Los Angeles counties.

140. Field measurements of the rate of movement of underground waters, by C. S. Slichter. 1905. 122 pp., 15 pls. 15c.

Contains chapters on measurements of underflow of Rio Hondo, San Gabriel, and Mohave rivers.

*142. The hydrology of San Bernardino Valley, Cal., by W. C. Mendenhall. 1905. 124 pp., 12 pls. 25c.

Discusses rainfall, soils, artesian areas, temperature, and chemical character of the ground waters, gives tables of flow of Santa Ana River, Mill Creek, and other streams, and lists of wells in Redlands and San Bernardino quadrangles.

146. Proceedings of second conference of engineers of the Reclamation Service, with accompanying papers, compiled by F. H. Newell, chief engineer. 1905. 267 pp. 15c. [Inquiries concerning this report should be addressed to the Reclamation Service.] Contains:

A report on "Underground waters of southern California," by W. C. Mendenhall. Gives an account of early irrigation by use of surface waters, the development of artesian wells for irrigation, and discusses the origin, distribution, and character of the artesian waters, the causes of fluctuations in the supply, and the need of moderation in use.

A report on the Klamath project, by J. B. Lippincott. Describes Klamath River and its principal tributaries and Lost River and Tule Lake. Describes also the irrigable lands in Butte Valley and around Tule and Lower Klamath lakes and in the Klamath Indian Reservation.

A brief report on "Pumping underground water in southern California," by F. C. Finkle. Discusses underground reservoirs, the source, extent, and methods of replenishment of the water supply, and describes the efficiency of pumps and the development of electric power for pumping.

147. Destructive floods in the United States in 1904, by E. C. Murphy and others. 1905. 206 pp., 18 pls. 15c. Contains:

Sacramento River flood, California, from report of S. G. Bennett. Gives accounts of flood on Sacramento River; describes briefly the streams of the basin, precipitation, discharge, damages, and prevention of future losses.

149. Preliminary list of deep borings in the United States, second edition, with additions, by N. H. Darton. 1905. 175 pp. 10c.

Gives, by States (and within the States by counties), location, depth, diameter, yield, height of water, and other information concerning wells 400 feet or more in depth; includes all wells listed in Water-Supply Papers 57 and 61; mentions also principal publications relating to deep borings.

152. A review of the laws forbidding pollution of inland waters in the United States (second edition), by E. B. Goodell. 1905. 149 pp. 10c.

Cites statutory restrictions of water pollution in California.

*162. Destructive floods in the United States in 1905, with a discussion of flood discharge and frequency and an index to flood literature by E. C. Murphy and others. 1906. 105 pp., 4 pls. 15c.

Gives estimates of flood flow and frequency (p. 85) for Tuolumne River at La Grange, Kern River at Rio Bravo ranch, and Kings River at Sanger.

*213. The surface water supply of California, 1906, by W. B. Clapp, with a section on ground-water levels in southern California, by W. C. Mendenhall. 1907. 219 pp., 4 pls. 25c.

Contains the results of a series of measurements of the fluctuation of ground-water levels made during 1904, 1905, and 1906. The wells were "so selected that they would be evenly distributed over the various basins which together make up the lowland areas of southern California, and would thus give an adequate basis for conclusions as to conditions in each of these basins."

*219. Ground waters and irrigation enterprises in the foothill belt, southern California, by W. C. Mendenhall. 1908. 180 pp., 9 pls. 50c.

Describes the general geologic conditions, physical features, rainfall, storage facilities, character and condition of subterranean reservoirs, measures for conservation of waters, and the ground waters by districts; discusses fluctuation in ground-water levels and gives results of measurements; describes irrigation enterprises and systems and gives statistics of wells.

*220. Geology and water resources of a portion of south-central Oregon, by G. A. Waring. 1908. 86 pp., 10 pls. 20c.

Describes the rocks, streams, lakes, and lake valleys, deep and shallow wells, climate, soils, vegetation, industries, and reclamation projects in Lake County; gives analyses of soils and waters. The greater part of the area described is considered part of the Great Basin, but the streams of a small area in the southern part are tributary to Goose Lake, which within historic times has overflowed southward to Pit River, a tributary of the Sacramento.

*222. Preliminary report on the ground waters of San Joaquin Valley, Cal., by W. C. Mendenhall. 1908. 52 pp., 1 pl. 10c.

Describes the geography of the valley, the rocks, soils, surface waters, and the origin, circulation, quantity, accessibility, and development of the ground waters; gives notes on water supply by counties.

237. The quality of the surface waters of California, by Walton Van Winkle and F. M. Eaton. 1910. 142 pp., 1 pl. 20c.

Describes geography, climate, industrial development, and drainage, and gives results of mineral analyses of the river waters.

251. Surface water supply of the United States, 1907–8, Part XI. California, by W. B. Clapp and W. F. Martin. 1910. 363 pp., 7 pls. 35c.

Contains a section (pp. 338-348) on "fluctuations in ground-water levels in the valley of southern California." The measurements here published form a continuation of those published in Water-Supply Paper 213. They were made at irregular intervals during 1907-8 on the same wells that were measured during the earlier period, except for a few wells that had become inaccessible.

274. Some stream waters of the western United States, with chapters on sediment carried by the Rio Grande and the industrial application of water analyses, by Herman Stabler. 1911. 188 pp. 15c.

Describes collection of samples, plan of analytical work, and methods of analyses; discusses soap-consuming power of waters, water softening, boiler waters, and water for irrigation; gives results of analyses of waters of Sacramento, Pit, Feather, Yuba, and American rivers, Stony and Putah creeks, and Tuolumne River; also of Link River, Oreg., in Klamath River basin.

295. Gazetteer of surface waters of California, Part I, Sacramento River basin, by B. D. Wood. 1912. 99 pp. 10c.

296. Gazetteer of surface waters of California, Part II, San Joaquin River basin, by B. D. Wood. 1912. 102 pp. 10c.

297. Gazetteer of surface waters of California, Part III, Pacific coast and Great Basin streams, by B. D. Wood. 1913. 244 pp. 20c.

Nos. 295-297 embrace descriptions of streams and lakes named on best available maps of California.

298. Water resources of California, Part I, Stream measurements in Sacramento River basin, by H. D. McGlashan and F. F. Henshaw. 1912. 411 pp., 8 pls. 30c.

299. Water resources of California, Part II, Stream measurements in San Joaquin River basin, by H. D. McGlashan and H. J. Dean. 1912. 439 pp., 7 pls. 35c.

*300. Water resources of California, Part III, Stream measurements in the Great Basin and Pacific coast river basins, by H. D. McGlashan and H. J. Dean. 1913. 956 pp., 4 pls. 55c.

Nos. 298-300 comprise all data concerning stream flow in California available up to September 30, 1912. The reports describe the drainage basins, precipitation, temperature, and forests, and give the results of work at gaging stations. See also Nos. 295-297.

338. Springs of California, by Gerald A. Waring. 1915. 410 pp., 13 pls. 60c.

Describes briefly the physical features of California, including the coast ranges, Great Central Valley, the lava-covered region, the Sierra Nevada, the southeastern desert, and faults; defines "mineral water" and "pure water"; discusses source and amount of substances in waters, degree of concentration of natural waters and their properties, and the therapeutic value, temperature, and classification of mineral waters. The springs are described under the headings "hot," "carbonated," "sulphur," "saline," "magnesic," "iron," "artesian," "large cold," and "minor perennial" springs.

*345. Contributions to the hydrology of the United States, 1914; N. C. Grover, chief hydraulic engineer. 1915. 225 pp., 17 pls. 30c. Contains:

(*h*) Ground-water resources of the Niles cone and adjacent areas, California, by W. O. Clark. Describes an area just east of the south end of San Francisco Bay. The investigation on which the report is based was made "to determine the source of the ground water, the quantity now being withdrawn, the amount available, and the area dependent on Alameda Creek." Describes the physiography and drainage of mountain and valley areas; gives records of precipitation in Alameda and Santa Clara counties and of the monthly discharge of Alameda Creek; discusses the source of the ground waters, the effect of the Niles-Irvington fault, contributions to the ground-water supply, relation of withdrawals to contributions, and gives a summary of conclusions.

363. Quality of the surface waters of Oregon, by W. Van Winkle. 1914. 137 pp., 2 pls. 20c.

Among the drainage basins described is Goose Lake, which has within historic times discharged southward to Pit River, a tributary of the Sacramento, and Klamath River, which enters the Pacific in northern California.

364. Water analyses from the laboratory of the United States Geological Survey, tabulated by F. W. Clarke, chief chemist. 1914. 40 pp. 5c.

Contains analyses of water from Matilija Hot Springs, Cal., and of mine waters from Nevada City and Sulphur Bank [near Clear Lake], Cal.

*375. Contributions to the hydrology of the United States, 1915; Nathan C. Grover, chief hydraulic engineer. 1916. 181 pp., 9 pls. 15c. Contains:

(*a*) Ground water for irrigation in the Sacramento Valley, Cal., by Kirk Bryan. Describes the geography and the geology of the valley and the origin and the movements of the ground water, and discusses problems relating to wells and to pumping; gives a brief account of the progress of irrigation with well water.

398. Ground water in San Joaquin Valley, Cal., by W. C. Mendenhall, R. B. Dole, and Herman Stabler. 1916. 310 pp., 5 pls. 25c.

Describes the geography of the valley and gives the geologic outline of the rocks of the border and the origin of the present surface; describes the occurrence and utilization of ground water, the chemical composition of surface and ground waters, and gives notes by counties. Contains 62 tables, most of which relate to the qualities of the waters.

*400. Contributions to the hydrology of the United States, 1916; Nathan C. Grover, chief hydraulic engineer. 108 pp., 7 pls. Contains:

(*e*) Ground water for irrigation in the Morgan Hill area, Cal., by W. O. Clark.

426. Southern California floods of January, 1916, by H. D. McGlashan and F. C. Ebert. 1918. 81 pp., 17 pls. 15c.

Compares the flood of January, 1916, with previous floods, summarizes the damages, and gives flood-flow records.

ANNUAL REPORTS.

Each of the papers contained in the annual reports was also issued in separate form.

Annual reports are distributed free by the Geological Survey as long as its stock lasts. An asterisk (*) indicates that this stock has been exhausted. Many of the papers so marked, however, may be purchased from the SUPERINTENDENT OF DOCUMENTS, WASHINGTON, D. C.

*Tenth Annual Report of the United States Geological Survey, 1888–89, J. W. Powell, Director. 1890. 2 parts. *Pt. II, Irrigation, viii, 123 pp. 35c.

Makes a preliminary report on the organization and prosecution of the survey of the arid lands for purposes of irrigation; includes an account of the methods of topographic and hydraulic work, the segregation work on reservoir sites and irrigable lands, field and office methods, and brief descriptions of the topography of some of the river basins.

Eleventh Annual Report of the United States Geological Survey, 1889–90, J. W. Powell, Director. 1891. 2 parts. Pt. II, Irrigation, xiv, 395 pp., 30 pls. (67–96) and maps. $1.25. Contains:

*Hydrography, pp. 1-110. Discusses scope of work, methods of stream measurement, rainfall, and evaporation, and describes the more important streams.

*Engineering, pp. 111-200. Defines the scope of the work and gives an account of the surveys in the Sun River basin and in the Arkansas, Rio Grande, California, Lahontan, Utah, and Snake River divisions.

*The arid lands, pp. 201-289. Includes statement of the Director to the House Committee on Irrigation and extracts from the constitutions of States relating to irrigation.

*Topography, pp. 291-343. Comprises reports of the topographic surveys in California, Nevada, Colorado, Idaho, Montana, and New Mexico, and a report on reservoir sites.

Twelfth Annual Report of the United States Geological Survey, 1890–91, J. W. Powell, Director. 1891. 2 parts. Pt. II, Irrigation, xviii, 576 pp., 93 pls. (54–146) $2. Contains:

*Report upon the location and survey of reservoir sites during the fiscal year ended June 30, 1891, by A. H. Thompson, pp. 1-212, pls. 54-57. Describes reservoir sites in California; for each reservoir site gives the location, height of dam, area inclosed by top contour, approximate contents of reservoir, position of irrigable lands, and areas of segregated lands.

*Hydrography of the arid regions, by F. H. Newell, pp. 213-361, pls. 58-106. Discusses the available water supply of the arid regions, the duty of water, flood waters, relation of rainfall to river flow; classifies the drainage basins; and describes the rivers of the Missouri, Arkansas, Rio Grande, Colorado, Sacramento, and San Joaquin basins, and the principal streams of the Great Basin in Nevada and Utah and the Snake River drainage.

Thirteenth Annual Report of the United States Geological Survey, 1891–92, J. W. Powell, Director. 1892. (Pts. II and III, 1893.) 3 parts. *Pt. III, Irrigation, xi, 486 pp., 77 pls. (108–184). $1.85. Contains:

*Engineering results of irrigation survey, by H. M. Wilson, pp. 351-427, pls. 147-182. Describes results of surveys of High Sierra reservoirs—Bear Valley, Kennedys Meadow, Kennedys Lake, Lake Eleanor, Tuolumne Meadows, Lake Tenaya, and Little Yosemite—and of Clear Lake, Cal.

Sixteenth Annual Report of the United States Geological Survey, 1894–95, Charles D. Walcott, Director. 1896. (Pts. II, III, and IV, 1895.) 4 parts. *Pt. II. Papers of an economic character, xix, 598 pp., 42 pls. $1.25. Contains:

The public lands and their water supply, by F. H. Newell, pp. 457–533, pls. 35–39. Describes general character of the public lands, the lands disposed of (railroad, grant and swamp lands, and private and miscellaneous entries), lands reserved (Indian, forest, and military reservations), the vacant lands, and the rate of disposal of vacant lands; discusses the streams, wells, and reservoirs as sources of water supply; gives details for each State.

Eighteenth Annual Report, United States Geological Survey, 1896–97, Charles D. Walcott, Director. 1897. 5 parts in 6 volumes. *Pt. IV, Hydrography, x, 756 pp., 102 pls. $1.75. Contains:

*Reservoirs for irrigation, by J. D. Schuyler, pp. 617-740, pls. 48-102. Describes rock-fill, masonry, and earthen dams, and hydraulic dam construction in California, and projected reservoirs; gives tables of reservoir capacities and areas.

Twentieth Annual Report of the United States Geological Survey, 1898–99, Charles D. Walcott, Director. 1899. (Parts II, III, IV, V, and VII, 1900.) 7 parts in 8 vols. and separate case for maps with Pt. V. *Pt. V, Forest Reserves, xix, 498 pp., 159 pls., 8 maps in separate case. $2.80. Contains:

*The San Gabriel Forest Reserve, by J. B. Leiberg, pp. 411–428, pls. 143-146. The San Bernardino Forest Reserve, by J. B. Leiberg, pp. 429–454, pls. 147-153. The San Jacinto Forest Reserve, by J. B. Leiberg, pp. 455–478, pls. 154-159. Describes general topographic features of forest reserves and drainage, part of which is by streams tributary to the Pacific and part by streams that are lost in the sands of the Mohave and other deserts.

PROFESSIONAL PAPERS.

Professional papers are distributed free by the Geological Survey as long as the stock lasts. An asterisk (*) indicates that this stock has been eshausted. Many of the papers marked with an asterisk may, however, be purchased from the SUPERINTENDENT OF DOCUMENTS, WASHINGTON, D. C. Professional papers are of quarto size.

105. Hydraulic-mining débris in the Sierra Nevada, by G. K. Gilbert. 154 pp., 34 pls. 1917. 50c.

Presents the results of an investigation undertaken by the United States Geological Survey in response to a memorial from the California Miners' Association asking that a particular study be made of portions of the Sacramento and San Joaquin valleys affected by detritus from torrential streams. The report deals largely with geologic and physiographic aspects of the subject, traces the physical effects, past and future, of the hydraulic mining of earlier decades, the similar effects which certain other industries induce through stimulation of the erosion of the soil, and the influence of the restriction of the area of inundation by the construction of levees. Suggests cooperation by several interests for the control of the streams now carrying heavy loads of débris.

BULLETINS.

An asterisk (*) indicates that the Geological Survey's stock of the paper is exhausted. Many of the papers so marked may be purchased from the SUPERINTENDENT OF DOCUMENTS, WASHINGTON, D. C.

*264. Record of deep-well drilling for 1904, by M. L. Fuller, E. F. Lines, and A. C. Veatch. 1905. 106 pp. 10c.

Discusses the importance of accurate well records to the driller, to owners of oil, gas, and water wells, and to the geologist; describes the general methods of work; gives tabulated records of wells in California, and detailed records of wells in Monterey and San Diego Counties, California. These wells were selected because they give definite stratigraphic information.

*298. Record of deep-well drilling for 1905, by M. L. Fuller and Samuel Sanford. 1906. 299 pp. 25c.

Gives an account of progress in the collection of well records and samples; contains tabulated records of wells in California; and detailed records of wells in Alameda, Fresno, Kern, Orange, San Luis Obispo, Santa Clara, Tulare, and Ventura Counties. The wells of which detailed sections are given were selected because they afford valuable stratigraphic information.

GEOLOGIC FOLIOS.

Under the plan adopted for the preparation of a geologic map of the United States the entire area is divided into small quadrangles, bounded by certain meridians and parallels, and these quadrangles, which number several thousand, are separately surveyed and mapped.[1] The unit of survey is also the unit of publication, and the maps and description of each quadrangle are issued in the form of a folio. When all the folios are completed they will constitute the Geologic Atlas of the United States.

A folio is designated by the name of the principal town or of a prominent natural feature within the quadrangle. Each folio includes maps showing the topography, geology, underground structure, and mineral deposits of the area mapped and several pages of descriptive text. The text explains the maps and describes the topographic and geologic features of the country and its mineral products. The topographic map shows roads, railroads, waterways, and, by contour lines, the shapes of the hills and valleys and the height above sea level of all points in the quadrangle. The areal-geology map shows the distribution of the various rocks at the surface. The structural-geology map shows the relations of the rocks to one another underground. The economic-geology map indicates the location of mineral deposits that are commercially valuable. The atresian-water map shows the depth to ground-water horizons. Economic-geology and artesian-water maps are included in folios if the conditions in the areas mapped warrant their publication. The folios are of special interest to students of geography and geology and are valuable as guides in the development and utilization on mineral resources.

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[1] Index maps showing areas in California covered by topographic maps and by geologic folios will be mailed on receipt of request addressed to the Director, U. S. Geological Survey, Washington, D. C.

The folios numbered from 1 to 163, inclusive, are published in only one form (18 by 22 inches), called the library edition. Some of the folios that bear numbers higher than 163 are published also in an octavo edition (6 by 9 inches). Owing to a fire in the Geological Survey Building May 18, 1913, the stock of geologic folios was more or less damaged by fire and water, but many are usable, and will be sold at the uniform price of 5 cents each, with no reduction for wholesale orders. This rate applies to folios in stock from 1 to 184, inclusive, also to the library edition of folio 186. The library edition of folios 185, 187, and higher numbers sells for 25 cents a copy, except that some folios which contain an unusually large amount of matter sell for 50 cents a copy. The octavo edition of folio 185 and higher numbers sells for 50 cents a copy. If 34 folios selling at 25 cents each (or their equivalent in higher-priced folios) are ordered at one time a discount of 40 per cent is allowed; $5.10 is the minimum amount accepted at this rate.

All the folios contain descriptions of the drainage of the quadrangles. The folios in the following list contain also brief discussions of the underground waters in connection with the economic resources of the areas and more or less information concerning the utilization of the water resources.

An asterisk (*) indicates that the stock of the folio is exhausted.

*17. Marysville folio.
*39. Truckee folio.
*66. Colfax folio.
101. San Luis folio. 5c.
*138. Redding folio.
*163. Santa Cruz folio
193. San Francisco folio, 75c. in either edition.

MISCELLANEOUS REPORTS.

Other Federal bureaus and State and other organizations have from time to time published reports relating to the water resources of various sections of the country. Notable among those pertaining to the Pacific slope of California are the reports of the Chief of Engineers, U. S. Army, the State engineer and surveyor, the State conservation commission, and the State water commission.

The following reports deserve special mention:

Hall, W. H., Physical data and statistics of California, 1886.
Report of the Commissioner of Public Works to the Governor of California, 1895.
Report of the State Water Commission of California, 1912.

GEOLOGICAL SURVEY HYDROLOGIC REPORTS OF GENERAL INTEREST.

The following list comprises reports not readily classifiable by drainage basins and covering a wide range of hydrologic investigations.

WATER-SUPPLY PAPERS.

*1. Pumping water for irrigation, by H. M. Wilson. 1896. 57 pp., 9 pls.

Describes pumps and motive powers, windmills, water wheels, and various kinds of engines; also storage reservoirs to retain pumped water until needed for irrigation.

*3. Sewage irrigation, by G. W. Rafter. 1897. 100 pp., 4 pls. (See Water-Supply Paper 22.) 10c.

Discusses methods of sewage disposal by intermittent filtration and by irrigation; describes utilization of sewage in Germany, England, and France, and sewage purification in the United States.

*8. Windmills for irrigation, by E. C. Murphy. 1897. 49 pp., 8 pls. 10c.

Gives results of experimental tests of windmills during the summer of 1896 in the vicinity of Garden, Kansas; describes instruments and methods and draws conclusions.

*14. New tests of certain pumps and water lifts used in irrigation, by O. P. Hood. 1898. 91 pp., 1 pl.

Discusses efficiency of pumps and water lifts of various types.

*20. Experiments with windmills, by T. O. Perry. 1899. 97 pp., 12 pls. 15c.

Includes tables and descriptions of wind wheels, compares wheels of several types, and discusses results.

*22. Sewage irrigation, Part II, by G. W. Rafter. 1899. 100 pp., 7 pls. 15c.

Gives résumé of Water-Supply Paper No. 3; discusses pollution of certain streams, experiments on purification of factory wastes in Massachusetts, value of commercial fertilizers, and describes American sewage-disposal plants by States; contains bibliography of publications relating to sewage utilization and disposal.

*41. The windmill, its efficiency and economic use, Part I, by E. C. Murphy. 1901. 72 pp., 14 pls. 5c.

*42. The windmill, its efficiency and economic use, Part II, by E. C. Murphy. 1901. 75 pp. (73–147), 2 pls. (15–16). 10c.

Nos. 41 and 42 give details of results of experimental tests with windmills of various types.

*56. Methods of stream measurement. 1901. 51 pp., 12 pls. 15c.

Describes the methods used by the Survey in 1901-2. See also Nos. 64, 94, and 95.

*64. Accuracy of stream measurements, by E. C. Murphy. 1902. 99 pp., 4 pls. (See No. 95.) 10c.

Describes methods of measuring velocity of water and of measuring and computing stream flow, and compares results obtained with the different instruments and methods; describes also experiments and results at the Cornell University hydraulic laboratory. A second, enlarged, edition published as Water-Supply Paper 95.

*67. The motions of underground waters, by C. S. Slichter. 1902. 106 pp., 8 pls. 15c.

Discusses origin, depth, and amount of ground waters; permeability of rocks and porosity of soils; causes, rates, and laws of motions of ground water; surface and deep zones of flow; and recovery of waters by open wells and artesian and deep wells; treats of the shape and position of the water table; gives simple methods of measuring yield of flowing wells; describes artesian wells at Savannah, Ga.

72. Sewage pollution in the metropolitan area near New York City and its effect on inland water resources, by M. O. Leighton. 1902. 75 pp., 8 pls. 10c.

Defines "normal" and "polluted" waters and discusses the damage resulting from pollution.

*80. The relation of rainfall to run-off, by G. W. Rafter. 1903. 104 pp. 10c.

Treats of measurements of rainfall and laws and measurements of stream flow; gives rainfall, run-off, and evaporation formulas; discusses effect of forests on rainfall and run-off.

87. Irrigation in India (second edition), by H. M. Wilson. 1903. 238 pp., 27 pls. 25c.

First edition was published in Part II of the Twelfth Annual Report.

93. Proceedings of first conference of engineers of the Reclamation Service, with accompanying papers, compiled by F. H. Newell, chief engineer. 1904. 361 pp. 25c. [Requests for this report should be addressed to the U. S. Reclamation Service.]

Contains the following papers of more or less general interest:
Limits of an irrigation project, by D. W. Ross.
Relation of Federal and State laws to irrigation, by Morris Bien.
Electrical transmission of power for pumping, by H. A. Storrs.
Correct design and stability of high masonry dams, by Geo. Y. Wisner.
Irrigation surveys and the use of the plane table, by J. B. Lippincott.
The use of alkaline waters for irrigation, by Thomas H. Means.

*94. Hydrographic manual of the United States Geological Survey, prepared by E. C. Murphy, J. C. Hoyt, and G. B. Hollister. 1904. 76 pp., 3 pls. 10c.

Gives instruction for field and office work relating to measurements of stream flow by current meters. See also No. 95.

*95. Accuracy of stream measurements (second, enlarged edition), by E. C. Murphy. 1904. 169 pp., 6 pls.

Describes methods of measuring and computing stream flow and compares results derived from different instruments and methods. See also No. 94.

*103. A review of the laws forbidding pollution of inland waters in the United States, by E. B. Goodell. 1904. 120 pp. (See No. 152.)

Explains the legal principles under which antipollution statutes become operative, quotes court decisions to show authority for various deductions, and classifies according to scope the statutes enacted in the different States.

110. Contributions to the hydrology of eastern United States, 1904; M. L. Fuller, geologist in charge. 1905. 211 pp., 5 pls. 10c.

Contains the following reports of general interest. The scope of each paper is indicated by its title.

Description of underflow meter used in measuring the velocity and direction of underground water, by Charles S. Slichter.

The California or "stovepipe" method of well construction, by Charles S. Slichter.

Approximate methods of measuring the yield of flowing wells, by Charles S. Slichter.

Corrections necessary in accurate determinations of flow from vertical well casings, from notes furnished by A. N. Talbot.

Experiment relating to problems of well contamination at Quitman, Ga., by S. W. McCallie.

113. The disposal of strawboard and oil-well wastes, by R. L. Sackett and Isaiah Bowman. 1905. 52 pp., 4 pls. 5c.

The first paper discusses the pollution of streams by sewage and by trade wastes, describes the manufacture of strawboard, and gives results of various experiments in disposing of the waste. The second paper describes briefly the topography, drainage, and geology of the region about Marion, Ind., the contamination of rock wells and of streams by waste oil and brine.

*114. Underground waters of eastern United States; M. L. Fuller, geologist in charge. 1905. 285 pp., 18 pls. 25c.

Contains report on "Occurrence of underground waters," by M. L. Fuller, discussing sources, amount, and temperature of waters, permeability and storage capacity of rocks, water-bearing formations, recovery of water by springs, wells, and pumps, essential conditions of artesian flows, and general conditions affecting ground waters in eastern United States.

119. Index to the hydrographic progress reports of the United States Geological Survey, 1888 to 1903, by J. C. Hoyt and B. D. Wood. 1905. 253 pp. 15c.

120. Bibliographic review and index of papers relating to underground waters published by the United States Geological Survey, 1879–1904, by M. L. Fuller. 1905. 128 pp. 10c.

*122. Relation of the law to underground waters, by D. W. Johnson. 1905. 55 pp. 5c.

Defines and classifies underground waters, gives common-law rules relating to their use and cites State legislative acts affecting them.

143. Experiments on steel-concrete pipes on a working scale, by J. H. Quinton. 1905. 61 pp., 4 pls. 5c.

Scope indicated by title.

145. Contributions to the hydrology of eastern United States, 1905; M. L. Fuller, geologist in charge. 1905. 220 pp., 6 pls. 10c.

Contains brief reports of general interest as follows:

Drainage of ponds into drilled wells, by Robert E. Horton. Discusses efficiency, cost, and capacity of drainage wells and gives statistics of such wells in southern Michigan.

Construction of so-called fountain and geyser springs, by Myron L. Fuller.

A convenient gage for determining low artesian heads, by Myron L. Fuller.

146. Proceedings of second conference of engineers of the Reclamation Service, with accompanying papers, compiled by F. H. Newell, chief engineer. 1905. 267 pp. 15c. [Requests for this report should be addressed to the U. S. Reclamation Service.]

Contains the following papers (scope indicated by title) of more or less general interest:
Proposed State code of water laws, by Morris Bien.
Power engineering applied to irrigation problems, by O. H. Ensign.
Estimates on tunneling in irrigation projects, by A. L. Fellows.
Collection of stream-gaging data, by N. C. Grover.
Diamond-drill methods, by G. A. Hammond.
Mean-velocity and area curves, by F. W. Hanna.
Importance of general hydrographic data concerning basins of streams gaged, by R. E. Horton.
Effect of aquatic vegetation on stream flow, by R. E. Horton.
Sanitary regulations governing construction camps, by M. O. Leighton.
Necessity of draining irrigated land, by Thos. H. Means.
Alkali soils, by Thos. H. Means.
Cost of stream-gaging work, by E. C. Murphy.
Equipment of a cable gaging station, by E. C. Murphy.
Silting of reservoirs, by W. M. Reed.
Farm-unit classification by D. W. Ross.
Cost of power for pumping irrigating water, by H. A. Storrs.
Records of flow at current-meter gaging stations during the frozen season, by F. H. Tillinghast.

147. Destructive floods in United States in 1904, by E. C. Murphy and others. 1905, 206 pp., 18 pls. 15c.

Contains a brief account of "A method of computing cross-section area of waterways," including formulas for maximum discharge and area of cross section.

*150. Weir experiments, coefficients, and formulas, by R. E. Horton. 1906. 189 pp., 38 pls. (See Water-Supply Paper 200.) 15c.

151. Field assay of water, by M. O. Leighton. 1905. 77 pp., 4 pls.

Discusses methods, instruments, and reagents used in determining turbidity, color, iron, chlorides, and hardness in connection with the studies of the quality of water in various parts of the United States.

152. A review of the laws forbidding pollution of inland waters in the United States (second edition), by E. B. Goodell. 1905. 149 pp. 10c.

*155. Fluctuations of the water level in wells, with special reference to Long Island, N. Y., by A. C. Veatch. 1906. 83 pp., 9 pls. 25c.

Includes general discussion of fluctuation due to rainfall and evaporation, barometric changes, temperature changes, changes in rivers, changes in lake level, tidal changes, effects of settlement, irrigation, dams, ground-water developments, and to indeterminate causes.

*160. Underground-water papers, 1906; M. L. Fuller, geologist in charge. 1906. 104 pp., 1 pl.

Gives account of work in 1905; lists publications relating to underground waters, and contains the following brief reports of general interest:

Significance of the term "artesian," by Myron L. Fuller.
Representation of wells and springs on maps, by Myron L. Fuller.
Total amount of free water in the earth's crust, by Myron L. Fuller.
Use of fluorescein in the study of underground waters, by R. B. Dole.
Problems of water contamination, by Isaiah Bowman.
Instances of improvement of water in wells, by Myron L. Fuller.

*162. Destructive floods in the United States in 1905, with a discussion of flood discharge and frequency and an index to flood literature, by E. C. Murphy and others. 1906. 105 pp., 4 pls. 15c.

*163. Bibliographic review and index of underground-water literature published in the United States in 1905, by M. L. Fuller, F. G. Clapp, and B. L. Johnson. 1906. 130 pp. 15c.

Scope indicated by title.

*179. Prevention of stream pollution by distillery refuse, based on investigations at Lynchburg, Ohio, by Herman Stabler. 1906. 34 pp., 1 pl. 10c.

Describes grain distillation, treatment of slop, sources, character, and effects of effluents on streams; discusses filtration, precipitation, fermentation, and evaporation methods of disposal of wastes without pollution.

*180. Turbine water-wheel tests and power tables, by R. E. Horton. 1906. 134 pp., 2 pls. 20c.

Scope indicated by title.

*185. Investigations on the purification of Boston sewage, by C.-E. A. Winslow and E. B. Phelps. 1906. 163 pp. 25c.

Discusses composition, disposal, purification, and treatment of sewages and tendencies in sewage-disposal practice in England, Germany, and the United States; describes character of crude sewage at Boston, removal of suspended matter, treatment in septic tanks, and purification in intermittent sand filtration and coarse material; gives bibliography

*186. Stream pollution by acid-iron wastes, a report based on investigations made at Shelby, Ohio, by Herman Stabler. 1906. 36 pp., 1 pl.

Gives history of pollution by acid-iron wastes at Shelby, Ohio, and resulting litigation; discusses effect of acid-iron liquors on sewage purification processes, recovery of copper as from acid-iron wastes, and other processes for removal of pickling liquor.

*187. Determination of stream flow during the frozen season, by H. K. Barrows and R. E. Horton. 1907. 93 pp., 1 pl. 15c.

Scope indicated by title.

*189. The prevention of stream pollution by strawboard waste, by E. B. Phelps. 1906. 29 pp., 2 pls.

Describes manufacture of strawboard, present and proposed methods of disposal of waste liquors, laboratory investigations of precipitation and sedimentation, and field studies of amounts and character of water used, raw material and finished product, and mechanical filtration.

*194. Pollution of Illinois and Mississippi rivers by Chicago sewage (a digest of the testimony taken in the case of the State of Missouri *v* The State of Illinois and the Sanitary District of Chicago), by M. O. Leighton. 1907. 369 pp., 2 pls.

Scope indicated by amplification of title.

ANNUAL REPORTS.

*Fifth Annual Report of the United States Geological Survey, 1883–84, J. W. Powell, Director. 1885. xxxvi, 469 pp., 58 pls. $2.25. Contains:

*The requisite and qualifying conditions of artesian wells, by T. C. Chamberlin, pp. 125–173, pl. 21. Scope indicated by title.

Twelfth Annual Report of the United States Geological Survey, 1890–91, J. W. Powell, Director. 1891. 2 parts. Pt. II, Irrigation, xviii, 576 pp., 93 pls. $2. Contains:

*Irrigation in India, by H. M. Wilson, pp. 363–561, pls. 107–146. See Water-Supply Paper 87.

Thirteenth Annual Report of the United States Geological Survey, 1891–92, J. W. Powell, Director. 1892. (Pts. II and III, 1893.) 3 parts. *Pt. III, Irrigation, xi, 486 pp., 77 pls. $1.85. Contains:

*American irrigation engineering, by H. M. Wilson, pp. 101–349, pls. 111–146. Discusses the economic aspects of irrigation, alkaline drainage, silt and sedimentation; gives brief history of legislation; describes perennial canals in Idaho, California, Wyoming, and Arizona; discusses water storage at reservoirs of the California and other projects, subsurface sources of supply, pumping, and subirrigation.

Fourteenth Annual Report of the United States Geological Survey, 1892–93, J. W. Powell, Director. 1893. (Pt. II, 1894.) 2 parts. *Pt. II, Accompanying papers, xx, 597 pp., 73 pls. $2.10. Contains:

*The potable waters of the eastern United States, by W. J. McGee, pp. 1–47. Discusses cistern water, stream waters, and ground waters, including mineral springs and artesian wells.

*Natural mineral waters of the United States, by A. C. Peale, pp. 49–88, pls. 3 and 4. Discusses the origin and flow of mineral springs, the source of mineralization, thermal springs, the chemical composition and analysis of spring waters, geographic distribution, and the utilization of mineral waters; gives a list of American mineral-spring resorts; contains also some analyses.

Nineteenth Annual Report of the United States Geological Survey, 1897–98, Charles D. Walcott, Director. 1898. (Parts II, III, and V, 1899.) 6 parts in 7 vols. and separate case for maps with Pt. V. *Pt. II, Papers chiefly of a theoretic nature, v, 958 pp., 172 pls. $2.65. Contains:

*Principles and conditions of the movements of ground water, by F. H. King, pp. 59–294, pls. 6–16. Discusses the amount of water stored in sandstone, in soil, and in other rocks, the depth to which ground water penetrates; gravitational, thermal, and capillary movements of ground waters, and the configuration of the ground-water surface; gives the results of experimental investigations on the flow of air and water through a rigid, porous media, and through sand, sandstones, and silts; discusses results obtained by other investigators, and summarizes results of observations; discusses also rate of flow of water through sand and rock, the growth of rivers, rate of filtration through soil, interference of wells, etc.

*Theoretical investigation of the motion of ground waters, by C. S. Slichter, pp. 295–384, pl. 17. Scope indicated by title.

PROFESSIONAL PAPERS.

*72. Denudation and erosion in the southern Appalachian region and the Monongahela basin, by L. C. Glenn. 1911. 137 pp., 21 pls. 35c.

Describes the topography, geology, drainage, forests, climate, population, and transportation facilities of the region, the relation of agriculture, lumbering, mining, and power development to erosion and denudation, and the nature, effects, and remedies of erosion; gives details of conditions in Holston, Nolichucky, French Broad, Little Tennessee, and Hiwassee River basins, along Tennessee River proper, and in the basins of the Coosa-Alabama system, Chattahoochee, Savannah, Saluda, Broad, Catawba, Yadkin, New, and Monongahela rivers.

*315. The purification of public water supplies, by G. A. Johnson. 1913. 84 pp., 8 pls. 10c.

Discusses ground, lake, and river waters as public supplies, development of waterworks systems in the United States, water consumption, and typhoid fever; describes methods of filtration and sterilization of water, and municipal water softening.

334. The Ohio Valley flood of March-April, 1913 (including comparisons with some earlier floods), by A. H. Horton and H. J. Jackson. 1913. 96 pp., 22 pls. 20c.

Although relating specifically to floods in the Ohio Valley, this report discusses also the causes of floods and the prevention of damage by floods.

337. The effects of ice on stream flow, by William Glenn Hoyt. 1913. 77 pp., 7 pls. 15c.

Discusses methods of measuring the winter flow of streams.

*345. Contributions to the hydrology of the United States, 1914. N. C. Grover, chief hydraulic engineer. 1915. 225 pp., 17 pls. 30c. Contains:

*(e) A method of determining the daily discharge of rivers of variable slope, by M. R. Hall, W. E. Hall, and C. H. Pierce, pp. 53-65.

364. Water analyses from the laboratory of the United States Geological Survey, tabulated by F. W. Clarke, chief chemist. 1914. 40 pp. 5c.

Contains analyses of waters from rivers, lakes, wells, and springs in various parts of the United States, including analyses of the geyser water of Yellowstone National Park, hot springs in Montana, brines from Death Valley, water from the Gulf of Mexico, and mine waters from Tennessee, Michigan, Missouri and Oklahoma, Montana, Colorado and Utah, Nevada and Arizona, and California.

371. Equipment for current-meter gaging stations, by G. J. Lyon. 1915. 64 pp., 37 pls. 20c.

Describes methods of installing automatic and other gages and of constructing gage wells, shelters, and structures for making discharge measurements and artificial controls.

*375. Contributions to the hydrology of the United States, 1915. N. C. Grover, chief hydraulic engineer. 1916. 181 pp., 9 pls. 15c. Contains:

*(c) The relation of stream gaging to the science of hydraulics, by C. H. Pierce and R. W. Davenport, pp. 77-84.

(e) A method of correcting river discharge for a changing stage, by B. E. Jones, pp. 117-130.

(f) Conditions requiring the use of automatic gages in obtaining records of stream flow, by C. H. Pierce, pp. 131-139.

Papers presented at the conference of engineers of the water-resources branch in December, 1914.

*400. Contributions to the hydrology of the United States, 1916. N. C. Grover, chief hydraulic engineer. 1917. 108 pp., 7 pls. Contains:

(a) The people's interest in water-power resources, by G. O. Smith, pp. 1-8.

*(c) The measurement of silt-laden streams, by R. C. Pierce, pp. 39-51.

(d) Accuracy of stream-flow data, by N. C. Grover and J. C. Hoyt, pp. 53-59.

416. The divining rod, a history of water witching, with a bibliography, by A. J. Ellis. 1917. 59 pp. 10c.

A brief paper published "merely to furnish a reply to the numerous inquiries that are continually being received from all parts of the country" as to the efficacy of the divining rod for locating underground water.

425. Contributions to the hydrology of the United States, 1917. N. C. Grover, chief hydraulic engineer. 1918. Contains:

*(c) Hydraulic conversion tables and convenient equivalents, pp. 71-94. 1917.

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A—Annual Reports; M—Monograph; B—Bulletin; P—Professional Paper; W—Water-Supply Paper; GF—Geologic Folio.]

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[2] Many analyses of river, spring, and well waters are scattered through publications as noted in abstracts.

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1915

PART XII. A. PACIFIC SLOPE BASINS IN WASHINGTON AND UPPER COLUMBIA RIVER BASIN

NATHAN C. GROVER, Chief Hydraulic Engineer
G. L. PARKER and W. A. LAMB, District Engineers

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SURFACE WATER SUPPLY OF PACIFIC SLOPE BASINS IN WASHINGTON AND UPPER COLUMBIA RIVER BASIN, 1915.

AUTHORIZATION AND SCOPE OF WORK.

This volume is one of a series of 14 reports presenting results of measurements of flow made on streams in the United States during the year ending September 30, 1915.

The data presented in these reports were collected by the United States Geological Survey under the following authority contained in the organic law (20 Stat. L., p. 394):

> *Provided*, That this officer [the Director] shall have the direction of the Geological Survey and the classification of public lands and examination of the geological structure, mineral resources, and products of the national domain.

The work was begun in 1888 in connection with special studies relating to irrigation in the arid west. Since the fiscal year ending June 30, 1895, successive sundry civil bills passed by Congress have carried the following item and appropriations:

> For gaging the streams and determining the water supply of the United States, and for the investigation of underground currents and artesian wells, and for the preparation of reports upon the best methods of utilizing the water resources.

Annual appropriations for the fiscal years ending June 30, 1895–1916.

1895	$12,500
1896	20,000
1897 to 1900, inclusive	50,000
1901 to 1902, inclusive	100.000
1903 to 1906, inclusive	200,000
1907	150,000
1908 to 1910, inclusive	100,000
1911 to 1916, inclusive	150.000

In the execution of the work many private and State organizations have cooperated either by furnishing data or by assisting in collecting data. Acknowledgements for cooperation of the first kind are made in connection with the description of each station affected; cooperation of the second kind is acknowledged on pages 14–15.

Measurements of stream flow have been made at about 3,800 points in the United States and also at many points in Alaska and the Hawaiian Islands. In July, 1915, 1,350 gaging stations were being maintained by the Survey and the cooperating organizations. Many miscellaneous discharge measurements are made at other points. In connection with this work data were also collected in regard to precipitation, evaporation, storage reservoirs, river profiles, and water power in many sections of the country and will be made available in water supply papers from time to time. Information in regard to publications relating to water resources is presented in the appendix to this report.

DEFINITION OF TERMS.

The volume of water flowing in a stream—the "run-off" or "discharge"—is expressed in various terms, each of which has become associated with a certain class of work. These terms may be divided into two groups—(1) those that represent a rate of flow, as second-feet, gallons per minute, miners' inches, and discharge in second-feet per square mile, and (2) those that represent the actual quantity of water, as run-off in depth of inches, acre-feet, and millions of cubic feet. The principal terms used in this series of reports are second-feet, second-feet per square mile, run-off in inches, acre-feet, and millions of cubic feet. They may be defined as follows:

"Second-feet" is an abbreviation for "cubic feet per second." A second-foot is the rate of discharge of water flowing in a channel of rectangular cross-section 1 foot wide and 1 foot deep at an average velocity of 1 foot per second. It is generally used as a fundamental unit from which others are computed by the use of the factors given in the tables of convenient equivalents (pp. 9–11).

"Second-feet per square mile" is the average number of cubic feet of water flowing per second from each square mile of area drained, on the assumption that the run-off is distributed uniformly both as regards time and area.

"Run-off (depth in inches)" is the depth to which an area would be covered if all the water flowing from it in a given period were uniformly distributed on the surface. It is used for comparing run-off with rainfall, which is usually expressed in depth of inches.

An "acre-foot," equivalent to 43,560 cubic feet, is the quantity required to cover an acre to the depth of 1 foot. The term is commonly used in connection with storage for irrigation.

"Millions of cubic feet" is applied to quantities of water stored in reservoirs, most frequently in connection with studies of flood control.

The following terms not in common use are here defined:

"Stage-discharge relation," an abbreviation for the term "relation of gage height to discharge."

"Control," "controlling section," and "point of control"; terms used to designate the section or sections of the stream below the gage which determine the stage-discharge relation at the gage. It should be noted that the control may not be the same section or sections at all stages.

The "point of zero flow" for a given gaging station is that point on the gage—the gage height—to which the surface of the river would fall if there were no flow.

CONVENIENT EQUIVALENTS.

The following is a list of convenient equivalents for use in hydraulic computations.

Table for converting discharge in second-feet per square mile into run-off in depth in inches over the area.

Discharge (second-feet per square mile).	Run-off (depth in inches).				
	1 day.	28 days.	29 days.	30 days.	31 days.
1	0.03719	1.041	1.079	1.116	1.153
2	.07438	2.083	2.157	2.231	2.306
3	.11157	3.124	3.236	3.347	3.459
4	.14876	4.165	4.314	4.463	4.612
5	.18595	5.207	5.393	5.578	5.764
6	.22314	6.248	6.471	6.694	6.917
7	.26033	7.289	7.550	7.810	8.070
8	.29752	8.331	8.628	8.926	9.223
9	.33471	9.372	9.707	10.041	10.376

NOTE.—For part of a month multiply the run-off for one day by the number of days.

Table for converting discharge in second-feet into run-off in acre-feet.

Discharge (second-feet).	Run-off (acre-feet).				
	1 day.	28 days.	29 days.	30 days.	31 days.
1	1.983	55.54	57.52	59.50	61.49
2	3.967	111.1	115.0	119.0	123.0
3	5.950	166.6	172.6	178.5	184.5
4	7.934	222.1	230.1	238.0	246.0
5	9.917	277.7	287.6	297.5	307.4
6	11.90	333.2	345.1	357.0	368.9
7	13.88	388.8	402.6	416.5	430.4
8	15.87	444.3	460.2	476.0	491.9
9	17.85	499.8	517.7	535.5	553.4

NOTE.—For part of a month multiply the run-off for one day by the number of days.

Table for converting discharge in second-feet into run-off in millions of cubic feet.

Discharge (second-feet).	Run-off (millions of cubic feet).				
	1 day.	28 days.	29 days.	30 days.	31 days.
1	0.0864	2.419	2.506	2.592	2.678
2	.1728	4.838	5.012	5.184	5.356
3	.2592	7.257	7.518	7.776	8.034
4	.3456	9.676	10.02	10.37	10.71
5	.4320	12.10	12.53	12.96	13.39
6	.5184	14.51	15.04	15.55	16.07
7	.6048	16.93	17.54	18.14	18.75
8	.6912	19.35	20.05	20.74	21.42
9	.7776	21.77	22.55	23.33	24.10

NOTE.—For part of a month multiply the run-off for one day by the number of days.

Table for converting discharge in second-feet into run-off in millions of gallons.

Discharge (second-feet).	Run-off (millions of gallons).				
	1 day.	28 days.	29 days.	30 days.	31 days.
1	0.6463	18.10	18.74	19.39	20.04
2	1.293	36.20	37.48	38.78	40.08
3	1.939	54.30	56.22	58.17	60.12
4	2.585	72.40	74.96	77.56	80.16
5	3.232	90.50	93.70	96.95	100.2
6	3.878	108.6	112.4	116.3	120.2
7	4.524	126.7	131.2	135.7	140.3
8	5.171	144.8	149.9	155.1	160.3
9	5.817	162.9	168.7	174.5	180.4

NOTE.—For part of a month multiply the run-off for one day by the number of days.

Table for converting velocity in feet per second into velocity in miles per hour.

[1 foot per second=0.681818 mile per hour, or two-thirds mile per hour, very nearly; 1 mile per hour=1.4666 feet per second. In computing the table the figures 0.68182 and 1.4667 were used.]

Feet per second (units).	Miles per hour for tenths of foot per second.									
	0	1	2	3	4	5	6	7	8	9
0	0.000	0.068	0.136	0.205	0.273	0.341	0.409	0.477	0.545	0.614
1	.682	.750	.818	.886	.995	1.02	1.09	1.16	1.23	1.30
2	1.36	1.43	1.50	1.57	1.64	1.70	1.77	1.84	1.91	1.98
3	2.05	2.11	2.18	2.25	2.32	2.39	2.45	2.52	2.59	2.66
4	2.73	2.80	2.86	2.93	3.00	3.07	3.14	3.20	3.27	3.34
5	3.41	3.48	3.55	3.61	3.68	3.75	3.82	3.89	3.95	4.02
6	4.09	4.16	4.23	4.30	4.36	4.43	4.50	4.57	4.64	4.70
7	4.77	4.84	4.91	4.98	5.05	5.11	5.18	5.25	5.32	5.39
8	5.45	5.52	5.59	5.66	5.73	5.80	5.86	5.93	6.00	6.07
9	6.14	6.20	6.27	6.34	6.41	6.48	6.55	6.61	6.68	6.75

Table for converting discharge in second-feet into theoretical horsepower per foot of fall.

[1 second-foot=0.1136 theoretical horsepower per foot of fall. Weight of 1 cubic foot of water=62.5 pounds.]

Tens.	Units.									
	0	1	2	3	4	5	6	7	8	9
0	0.00	0.114	0.227	0.341	0.454	0.568	0.682	0.795	0.909	1.02
1	1.14	1.25	1.36	1.48	1.59	1.70	1.82	1.93	2.04	2.16
2	2.27	2.39	2.50	2.61	2.73	2.84	2.95	3.07	3.18	3.29
3	3.41	3.52	3.64	3.75	3.86	3.98	4.09	4.20	4.32	4.43
4	4.54	4.66	4.77	4.88	5.00	5.11	5.23	5.34	5.45	5.57
5	5.68	5.79	5.91	6.02	6.13	6.25	6.36	6.48	6.59	6.70
6	6.82	6.93	7.04	7.16	7.27	7.38	7.50	7.61	7.72	7.84
7	7.95	8.07	8.18	8.29	8.41	8.52	8.63	8.75	8.86	8.97
8	9.09	9.20	9.32	9.43	9.54	9.66	9.77	9.88	10.0	10.1
9	10.2	10.3	10.5	10.6	10.7	10.8	10.9	11.0	11.1	11.2

1 second-foot equals 40 California miner's inches (law of Mar. 23, 1901).

1 second-foot equals 38.4 Colorado miner's inches.

1 second-foot equals 40 Arizona miner's inches.

1 second-foot equals 7.48 United States gallons per second; equals 448.8 gallons per minute; equals 646,317 gallons for one day.

1 second-foot for one year (365 days) covers 1 square mile 1.1312 feet, or 13.5744 inches deep.

1 second-foot for one year (365 days) equals 31,536,000 cubic feet.

1 second-foot equals about 1 acre-inch per hour.

1 second-foot for one year (365 days) equals 724 acre-feet.

1 second-foot for one day equals 86,400 cubic feet.

1,000,000,000 (1 United States billion) cubic feet equals 11,570 second-feet for one day.

1,000,000,000 cubic feet equals 414 second-feet for one 28-day month.

1,000,000,000 cubic feet equals 399 second-feet for one 29-day month.

1,000,000,000 cubic feet equals 386 second-feet for one 30-day month.

1,000,000,000 cubic feet equals 373 second-feet for one 31-day month.

100 California miner's inches equals 18.7 United States gallons per second.

100 California miner's inches for one day equals 4.96 acre-feet.

100 Colorado miner's inches equals 2.60 second-feet.

100 Colorado miner's inches equals 19.5 United States gallons per second.

100 Colorado miner's inches for one day equals 5.17 acre-feet.

100 United States gallons per minute equals 0.223 second-foot.

100 United States gallons per minute for one day equals 0.442 acre-foot.

1,000,000 United States gallons per day equals 1.55 second-feet.

1,000,000 United States gallons equals 3.07 acre-feet.

1,000,000 cubic feet equals 22.95 acre-feet.

1 acre-foot equals 325,850 gallons.

1 inch deep on 1 square mile equals 2,323,200 cubic feet.

1 inch deep on 1 square mile equals 0.0737 second-foot per year.

1 foot equals 0.3048 meter.

1 mile equals 1.60935 kilometers.

1 mile equals 5,280 feet.

1 acre equals 0.4047 hectare.

1 acre equals 43,560 square feet.

1 acre equals 209 feet square, nearly.

1 square mile equals 2.59 square kilometers.

1 cubic foot equals 0.0283 cubic meter.

1 cubic foot of water weighs 62.5 pounds.

1 cubic meter per minute equals 0.5886 second-foot.

1 horsepower equals 550 foot-pounds per second.

1 horsepower equals 76.0 kilogram-meters per second.

1 horsepower equals 746 watts.

1 horsepower equals 1 second-foot falling 8.80 feet.

1⅓ horsepower equals about 1 kilowatt.

To calculate water power quickly: $\frac{\text{Second-feet} \times \text{fall in feet}}{11}$ = net horse power on water wheel realizing 80 per cent of theoretical power.

EXPLANATION OF DATA.

The data presented in this report cover the year beginning October 1, 1914, and ending September 30, 1915. At the beginning of January in most parts of the United States much of the precipitation in the preceding three months is stored as ground water in the form of snow or ice, or in ponds, lakes, and swamps, and this stored water passes off in the streams during the spring break-up. At the end of September, on the other hand, the only stored water available for run-off is possibly a small quantity in the ground; therefore the run-off for the year beginning October 1 is practically all derived from precipitation within that year.

The base data collected at gaging stations consist of records of stage, measurements of discharge, and general information used to supplement the gage heights and discharge measurements in determining the daily flow. The records of stage are obtained either from direct readings on a staff gage or from a water-stage recorder that gives a continuous record of the fluctuations. Measurements of discharge are made with a current meter by the general methods outlined in standard textbooks on the measurement of river discharge. (See Pls. I, II.)

From the discharge measurements rating tables are prepared that give the discharge for any stage, and these rating tables, when applied to the gage heights, give the discharge from which the daily, monthly, and yearly mean discharge is determined.

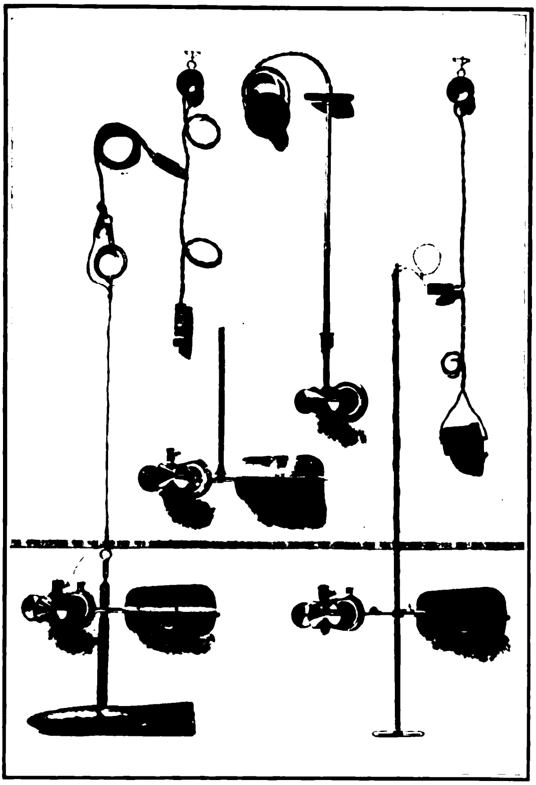
The data presented for each gaging station in the area covered by this report comprise a description of the station, a table giving results of discharge measurements, a table showing the daily discharge of the stream, and a table of monthly and yearly discharge and run-off.

If the base data are insufficient to determine the daily discharge, tables giving daily gage heights and results of discharge measurements are published.

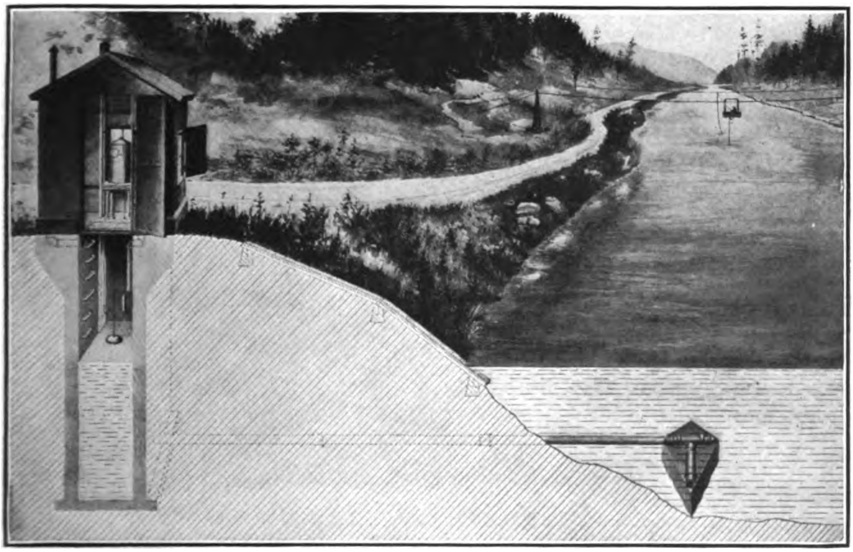
The description of the station gives, in addition to statements regarding location and equipment, information in regard to any conditions that may affect the constancy of the stage-discharge relation, covering such subjects as the occurrence of ice, the use of the stream for log driving, shifting of channel, and the cause and effect of backwater; it gives also information as to diversions that decrease the flow at the gage, artificial regulation, maximum and minimum recorded stages, and the accuracy of the records.

The table of daily discharge in general gives the discharge in second-feet corresponding to the mean of the gage heights read each day. At stations on streams subject to sudden or rapid diurnal fluctuation the discharge obtained from the rating table and the mean daily gage height may not be the true mean discharge for the day. If such stations are equipped with water-stage recorders the mean daily discharge may be obtained by averaging discharge at regular intervals during the day or by use of the discharge integrator, an instrument operating on the principle of the planimeter and containing as an essential element the rating curve of the station.

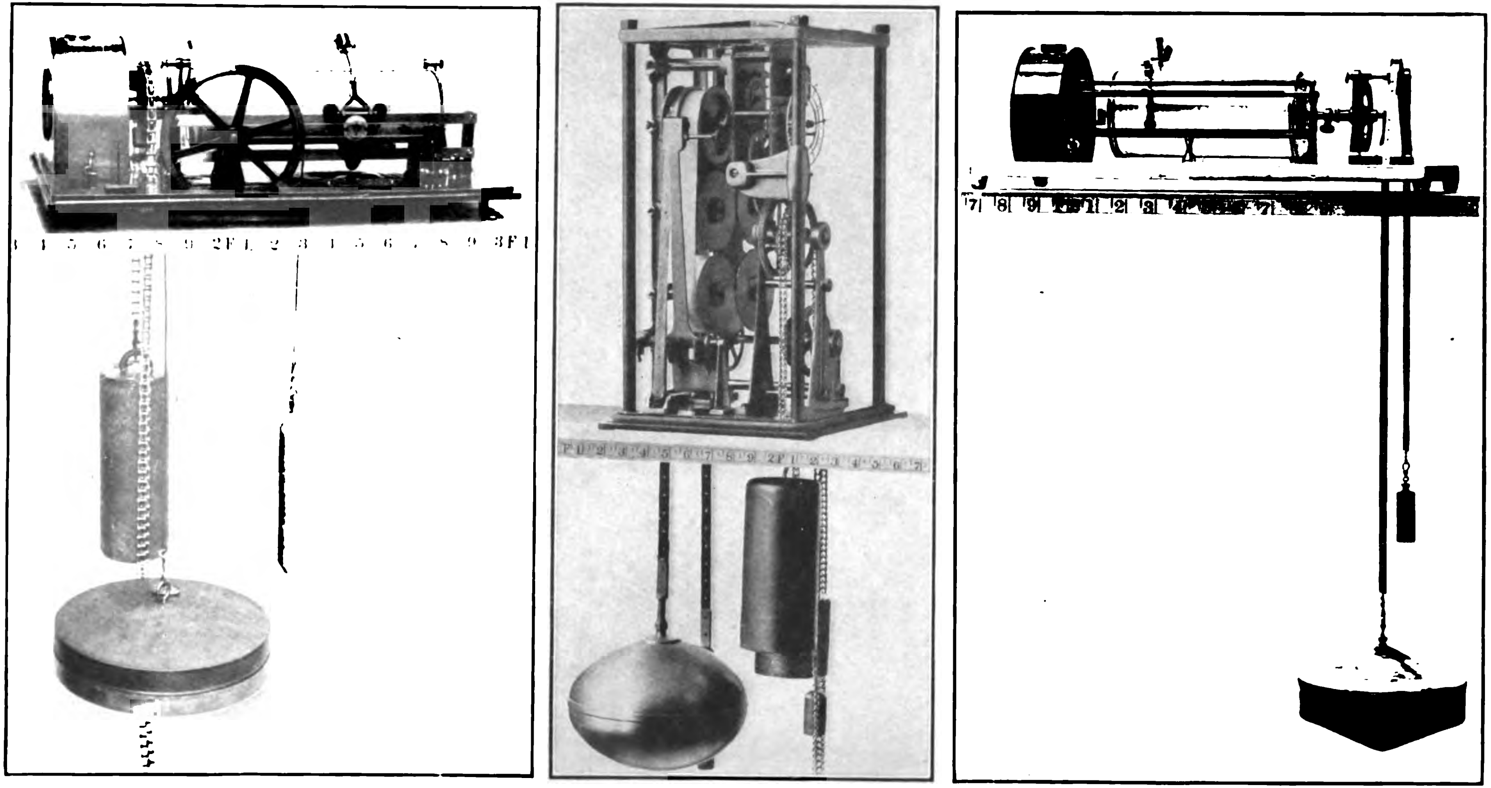
In the table of monthly discharge the column headed "Maximum" gives the mean flow for the day when the mean gage height was highest. As the gage height is the mean for the day it does not indicate correctly the stage when the water surface was at crest height and the corresponding discharge was consequently larger than given in the maximum column. Likewise, in the column headed "Minimum" the quantity given is the mean flow for the day when



A. PRICE CURRENT METERS.



B. TYPICAL GAGING STATION.



A. STEVENS.

B. GURLEY PRINTING.

C. FRIEZ.

WATER-STAGE RECORDERS.

the mean gage height was lowest. The column headed "Mean" is the average flow in cubic feet for each second during the month. On this average flow computations recorded in the remaining columns, which are defined on page 6, are based.

ACCURACY OF FIELD DATA AND COMPUTED RESULTS.

The accuracy of stream-flow data depends primarily (1) on the permanency of the stage-discharge relation, and (2) on the accuracy of observation of stage, measurements of flow, and interpretation of records.

Footnotes added to the daily discharge tables give information regarding the probable accuracy of the rating tables used, and an accuracy column is inserted in the monthly discharge table. For the rating tables, "well defined" indicates, in general, that the rating is probably accurate within 5 per cent; "fairly well defined," within 10 per cent; "poorly defined" within 15 to 25 per cent. These notes are very general and are based on the plotting of the individual measurements with reference to the mean rating curve.

The letter in the column headed "Accuracy," in the table showing monthly discharge, rates the accuracy of the monthly mean and not that of the estimate of maximum or minimum discharge or the discharge for any one day. The rating is determined by considering the accuracy of the rating curve, the probable reliability of the observer, the number of gage readings per day, the range of the fluctuation in stage, and local conditions. In this column, A indicates that the mean monthly flow is probably accurate within 5 per cent; B, within 10 per cent; C, within 15 per cent; D, within 25 per cent. Special conditions are covered by footnotes.

The monthly means for any station may represent with high accuracy the quantity of water flowing past the gage, but the figures showing discharge per square mile and depth of run-off in inches may be subject to gross errors caused by the inclusion of large noncontributing districts in the measured drainage area, by lack of information concerning water diverted for irrigation or other use, or by inability to interpret the effect of artificial regulation of the flow of the river above the station. "Second-feet per square mile" and "Run-off (depth in inches)" are therefore not computed if such errors appear probable. The computations are also omitted for stations on streams draining areas in which the annual rainfall is less than 20 inches. All figures representing "second-feet per square mile" and "run-off (depth in inches)" previously published by the Survey should be used with caution because of possible inherent sources of error not known to the Survey.

The table of monthly discharge gives only a general idea of the flow at the station and should not be used for other than preliminary estimates; the tables of daily discharge allow more detailed studies of the variation in flow. It should be borne in mind, however, that the observations in each succeeding year may be expected to throw new light on data previously published.

COOPERATION.

During the year ending September 30, 1915, the work in Washington, Montana, and Idaho has been done under cooperative agreements between the United States Geological Survey and the respective States.

Cooperation with the States is effected under contracts which are made between the Director of the Federal Survey and the State engineers or other officials and are authorized by legislative acts appropriating moneys. The State contracts are essentially of the same order, the principal provisions being substantially as follows:

1. The United States Geological Survey retains direct supervision of the field work and the preparation of the data for publication.
2. The Federal Survey retains possession of all material collected—field notes, maps, etc.—but this material is open at all times to inspection by the State officials, and if not satisfactory the agreements can be terminated at any time.
3. The salaries of gage observers and the salaries and traveling and field expenses of the engineers are divided between the two parties in some manner agreed upon, the accounts being rendered monthly in accordance with the regulations of the Federal Survey.
4. The streams and localities in which investigations shall be made are determined by conference between the State officials and the representatives of the United States Geological Survey.
5. The cost of publication is borne entirely by the Federal Survey.

In general, the cooperative agreements specify that the United States Geological Survey shall allot from its appropriation a sum equal to that appropriated from State funds.

The work in Washington was done in cooperation with the Board of Geological Survey, composed of Ernest Lister, governor; L. F. Hart, lieutenant governor; Edward Meath, treasurer; Henry Landes. acting president of the University of Washington; and E. A. Bryan, president of the State College. The board was very efficiently represented in the cooperative investigations by Henry Landes, State geologist.

Special acknowledgments are due to A. W. Mahon, State engineer of Montana, and to J. H. Smith, State engineer of Idaho, for the very efficient manner in which they represented their States in the cooperative investigations.

Acknowledgments are also due to the engineers and employees of the United States Reclamation Service, the United States Forest

Service, and of the United States Office of Indian Affairs for assistance, suggestions, and the freest use of data gathered exclusively for them and for which they have paid. Acknowledgments are also due to the officers of the United States Weather Bureau for hydrographic and climatologic data and to the United States Bureau of Fisheries for furnishing gage heights.

The following cities, private companies, and irrigation districts have cooperated in the collection of records: Spokane Valley Land & Water Co., Similkameen Power Co., Wenatchee Valley Gas & Electric Co., and Quincy Valley Irrigation District.

DIVISION OF WORK.

The field data were collected under the supervision of G. L. Parker and W. A. Lamb, district engineers, by F. B. Storey, A. H. Tuttle, J. T. Hartson, C. O. Brown, C. G. Paulsen, I. L. Collier, B. E. Jones, and J. M. Ray, and by E. W. Kramer, district engineer for the United States Forest Service.

The field data in the Yakima River basin, exclusive of gaging stations in the Yakima Indian Reservation, and the ratings, special estimates, analyses, and computations were made in cooperation with Paul Taylor, engineer in charge of hydrometric work, United States Reclamation Service, assisted by F. E. Moxley, H. W. Humphrey, and R. S. Calland.

The ratings, special estimates, analyses, and computations for stations in Washington and Idaho were made under the direction of G. L. Parker, district engineer, assisted by A. H. Tuttle, C. O. Brown, J. T. Hartson, C. G. Paulsen, James E. Stewart, and Lasley Lee. The ratings, special estimates, analyses, and computations for stations in Montana were made under the direction of W. A. Lamb, district engineer, assisted by B. E. Jones and A. H. Tuttle.

The manuscript has been prepared by James E. Stewart and Lasley Lee.

GAGING-STATION RECORDS.

QUINAULT RIVER BASIN.

QUINAULT RIVER AT QUINAULT LAKE, WASH.

Location.—In the NE. ¼ sec. 8, T. 23 N., R. 9 W., at mouth of Canoe Creek, at north end of Quinault Lake, at Quinault post office, 35 miles north of Hoquiam, Grays Harbor County.

Drainage area.—273 square miles (measured on map of Olympia National Forest).

Records available.—October 29, 1911, to September 30, 1915.

Gage.—Vertical staff in two sections, on right bank of Canoe Creek 400 feet above mouth; read twice daily to hundredths by A. V. Higley. Gage read October 29, 1911, to December 31, 1912, was at Ingram Hotel on the south shore of lake, at datum 1.05 foot lower. All gage heights have been corrected to datum of present gage.

Discharge measurements.—Made from boat or from cable half a mile below outlet of lake and about 4 miles below gage.

Channel and control.—Stream bed composed of boulders. Control practically permanent. Left bank high and wooded; not subject to overflow; right bank low and wooded; overflowed at about gage height 18 feet. Zero flow would occur at gage height −2.0 feet, as determined August 18, 1915.

Extremes of discharge.—Maximum stage recorded during year, 9.9 feet at 7 a. m. October 19 (discharge, 16,000 second-feet); minimum stage recorded, 0.10 foot at 7 a. m. and 5 p. m., September 30 (discharge, 400 second-feet).

1911–1915: Maximum stage recorded, 16.3 feet at 8 a. m. January 6, 1914 (discharge, 32,500 second-feet); minimum stage recorded September 30, 1915.

Winter Flow.—Stage-discharge relation not affected by ice.

Diversions.—None.

Regulation.—Natural storage in Quinault Lake.

Accuracy.—Results good.

Discharge measurements of Quinault River at Quinault Lake, Wash., during the year ending Sept. 30, 1915.

[Made by A. H. Tuttle.]

Date.	Gage height.	Dis-charge.	Date.	Gage height.	Dis-charge.	Date.	Gage height.	ch
	Feet.	*Sec.-ft.*		*Feet.*	*Sec.-ft.*		*Feet.*	*Sec.-ft.*
May 28	4.82	5,220	Aug. 18	0.52	522	Sept. 23	0.22	459
Aug. 18	.52	545	Sept. 23	.22	455			

Daily discharge, in second-feet, of Quinault River at Quinault Lake, Wash., for the year ending Sept. 30, 1915.

Day.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.
1	1,490	5,700	4,280	1,770	1,670	2,080	6,740	1,670	2,910	1,220	770	550
2	1,490	10,900	3,990	3,300	1,870	1,870	14,300	1,580	2,670	1,220	740	[illegible]
3	1,490	11,200	3,710	4,580	1,970	1,770	13,100	1,490	2,550	1,310	740	[illegible]
4	1,400	9,680	3,300	4,280	1,970	1,770	9,050	1,490	2,310	1,220	740	[illegible]
5	1,400	7,840	3,040	3,570	2,190	1,670	6,740	1,490	2,310	1,220	740	550
6	1,220	6,380	2,670	3,040	3,040	1,770	4,730	1,670	2,430	1,220	710	530
7	1,180	5,530	2,430	2,670	3,570	1,770	4,890	1,670	2,430	1,140	680	530
8	1,140	4,890	2,310	3,170	3,300	1,670	4,580	1,770	2,310	1,140	650	550
9	1,060	5,370	2,190	3,170	2,910	1,580	3,990	1,770	2,080	1,140	650	575
10	1,490	4,730	1,970	3,170	2,790	1,490	3,570	2,190	1,970	1,100	625	550
11	1,970	4,730	1,770	4,280	2,550	1,490	3,710	2,790	1,870	1,020	625	550
12	2,670	4,730	1,670	4,730	2,310	1,490	3,040	2,910	1,770	1,060	600	530
13	3,990	5,370	1,580	3,990	2,250	2,310	4,890	2,670	1,670	1,060	600	510
14	3,710	5,370	1,490	3,850	2,190	2,910	3,430	2,550	1,670	1,060	575	490
15	3,040	4,430	1,490	3,430	1,970	7,280	3,170	2,430	1,580	1,060	575	490
16	3,710	3,850	1,400	2,910	1,970	6,920	3,170	2,190	1,580	1,060	575	490
17	9,470	3,990	1,310	2,550	2,190	5,370	2,790	2,080	1,580	1,100	575	470
18	13,100	2,910	1,220	2,310	2,190	5,210	2,790	2,190	1,580	1,060	550	470
19	15,500	2,910	1,180	2,190	1,970	4,890	2,550	2,310	1,490	1,020	550	445
20	12,000	3,570	1,140	2,080	1,970	4,730	2,430	2,430	1,490	945	550	445
21	8,440	3,710	1,100	1,870	1,670	3,170	2,550	2,430	1,400	945	575	445
22	6,210	3,430	1,020	1,770	1,770	3,300	2,430	2,430	1,310	945	575	445
23	4,890	3,570	1,020	1,670	1,870	3,300	2,310	2,430	1,310	875	575	430
24	3,300	2,910	980	1,580	1,970	3,040	2,080	2,550	1,310	875	575	430
25	3,170	4,130	1,020	1,490	2,550	2,790	1,970	3,430	1,310	840	575	430
26	3,170	4,130	1,100	1,400	2,550	2,430	1,970	4,580	1,310	840	550	415
27	2,980	4,280	1,220	1,310	2,430	2,190	1,870	4,890	1,220	805	550	415
28	2,800	5,370	1,310	1,310	2,310	2,080	1,770	5,370	1,180	805	530	415
29	2,620	5,050	1,310	1,220	....	2,190	1,670	5,370	1,180	805	530	400
30	2,430	4,580	1,400	1,180	....	2,550	1,770	3,710	1,180	805	530	400
31	2,910	....	1,670	1,310	....	2,790	....	3,040	....	805	530	....

Note.—Discharge ascertained from rating curve well defined between 400 and 12,000 second-feet. Recorded gage heights apparently in error Oct. 27–30; discharge estimated. Discharge interpolated, for lack of gage reading, Feb. 13.

Monthly discharge of Quinault River at Quinault Lake, Wash., for the year ending Sept. 30, 1915.

[Drainage area, 273 square miles.]

Month.	Discharge in second-feet.				Run-off.		Accuracy.
	Maximum.	Minimum.	Mean.	Per square mile.	Depth in inches on drainage area.	Total in acre-feet.	
October	15,500	1,060	4,050	14.8	17.06	249,000	A.
November	11,200	2,910	5,170	18.9	21.09	308,000	A.
December	4,280	980	1,850	6.78	7.82	114,000	A.
January	4,730	1,180	2,620	9.60	11.07	161,000	A.
February	3,570	1,670	2,280	8.35	8.70	127,000	A.
March	7,280	1,490	2,900	10.6	12.22	178,000	A.
April	14,300	1,670	4,140	15.2	16.96	246,000	A.
May	5,370	1,490	2,630	9.63	11.10	162,000	A.
June	2,910	1,180	1,770	6.48	7.23	105,000	A.
July	1,310	805	1,020	3.74	4.31	62,700	A.
August	770	530	610	2.23	2.57	37,500	A.
September	600	400	490	1.79	2.00	29,200	B.
The year	15,500	400	2,460	9.01	122.13	1,780,000	

PUGET SOUND BASINS.

PUYALLUP RIVER NEAR ELECTRON, WASH.

LOCATION.—In the NE. ¼ NW. ¼ sec. 3, T. 16 N., R. 6 E., 1,000 feet above intake of Puget Sound Traction, Light & Power Co.'s flume, one-fourth mile below Mowich River, and 10 miles east of Electron, in Pierce County.

DRAINAGE AREA.—91 square miles (measured on Plate IV, Water-Supply Paper 313).

RECORDS AVAILABLE.—January 1, 1909, to September 30, 1915.

GAGE.—Friez water-stage recorder attached to downstream side of left abutment of gaging bridge, 1,000 feet above intake.

DISCHARGE MEASUREMENTS.—Made from footbridge at gage.

CHANNEL AND CONTROL.—Large boulders, gravel, and sand; shifting at all stages, owing to steep gradient and large amount of glacial silt in water.

EXTREMES OF DISCHARGE.—Maximum stage during year, from water-stage recorder, 3.25 feet at 10 p. m. November 2 (discharge, 2,070 second-feet). Minimum discharge estimated at 112 second-feet December 24, during period of ice affect.

1909–1915: Maximum stage recorded, 4.6 feet November 10, 1910 (discharge, 3,200 second-feet). Minimum discharge on December 24, 1914.

WINTER FLOW.—Stage-discharge relation slightly affected by ice; flow estimated from observer's notes and records of precipitation and temperature.

DIVERSIONS.—None above station.

REGULATION.—None.

ACCURACY.—Results excellent, except for period in which ice affected stage-discharge relation.

COOPERATION.—Record of gage heights and discharge measurements furnished by Puget Sound Traction, Light & Power Co.

Discharge measurements of Puyallup River near Electron, Wash., during the year ending Sept. 30, 1915.

Date.		Made by—	Gage height.	Discharge.	Date.		Made by—	Gage height.	Discharge.
			Feet.	*Sec.-ft.*				*Feet.*	*Sec.-ft.*
Oct.	8	Barber and Waite	0.74	256	Mar.	22	Barber and Waite	0.96	324
	22	.....do	.97	338	Apr.	2	.....do	2.93	1,730
Nov.	7	.....do	1.53	649		20	.....do	1.03	325
	24	.....do	1.34	509	May	7	.....do	.97	298
Dec.	7	.....do	.69	207		24	.....do	1.04	324
	29	.....do	.49	159	June	3	.....do	1.37	513
Jan.	8	.....do	.95	294		24	.....do	1.29	484
	25	.....do	.59	177	July	7	.....do	1.59	671
Feb.	12	.....do	.61	181		25	.....do	1.34	517
	23	.....do	.50	160	Aug.	6	.....do	1.72	751
Mar.	6	.....do	.57	173		24	.....do	2.01	936
	12	.....do	.49	162	Sept.	6	.....do	1.10	304
	12	Hartson and Barber	.49	163		24	.....do	.86	220

Daily discharge, in second-feet, of Puyallup River near Electron, Wash., for the year ending Sept. 30, 1915.

Day.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.
1	278	622	280	249	285	173	683	218	578	681	746	424
2	322	884	262	212	218	166	1,660	222	675	808	890	338
3	259	1,540	248	231	209	161	1,320	234	545	860	789	413
4	232	1,220	231	204	188	224	882	225	508	800	588	506
5	235	1,140	225	190	266	193	621	241	576	681	650	384
6	248	954	212	196	273	185	508	276	589	810	709	288
7	252	702	207	198	244	183	520	335	538	635	582	269
8	252	563	204	285	231	175	418	359	502	709	561	374
9	259	551	198	238	244	173	378	490	373	538	584	305
10	448	496	190	246	222	175	359	436	363	445	672	242
11	428	924	183	321	207	166	378	317	359	403	681	247
12	814	862	175	262	193	161	403	266	330	431	628	278
13	648	1,530	163	248	185	161	368	255	354	429	605	210
14	557	946	154	255	180	260	321	251	363	461	673	194
15	520	661	148	244	178	445	313	231	403	445	694	244
16	591	532	141	212	178	330	340	225	418	641	661	290
17	556	450	137	198	198	300	378	320	383	749	589	345
18	629	413	133	198	193	321	398	405	359	570	610	364
19	702	492	128	207	171	273	383	340	393	576	729	359
20	520	1,200	122	212	168	258	354	330	393	725	808	334
21	413	845	124	209	171	273	288	296	383	922	833	331
22	359	661	122	201	163	313	262	292	450	791	954	296
23	327	532	113	201	163	340	241	288	508	695	922	248
24	309	502	112	196	176	313	241	335	484	699	905	239
25	293	456	124	185	193	269	234	340	398	628	835	264
26	285	440	190	180	171	244	238	378	420	582	922	278
27	281	373	183	173	171	231	248	807	468	514	800	232
28	273	340	180	173	180	248	269	1,280	413	534	748	204
29	302	317	159	173	....	284	288	788	472	570	896	224
30	435	296	166	171	....	280	241	595	576	635	794	281
31	344	....	193	190	....	248	....	558	....	715	479	....

NOTE.—Discharge ascertained as follows: Oct. 1 to Nov. 12, from rating curve well defined between 200 and 900 second-feet; Nov. 13 to Aug. 29, from rating curve well defined between 135 and 1,400 second-feet; Aug. 30 to Sept. 30, from rating curve well defined between 200 and 900 second-feet. Discharge estimated because of ice Dec. 12–26, as in table.

Monthly discharge of Puyallup River near Electron, Wash., for the year ending Sept. 30 1915.

[Drainage area, 91 square miles.]

Month.	Discharge in second-feet.				Run-off.		Accuracy.
	Maximum.	Minimum.	Mean.	Per square mile.	Depth in inches on drainage area.	Total in acre-feet.	
October	814	232	399	4.38	5.05	24,500	A.
November	1,540	296	715	7.86	8.77	42,500	A.
December	280	112	174	1.91	2.20	10,700	C.
January	321	171	215	2.36	2.72	13,200	A.
February	285	163	201	2.21	2.30	11,200	A.
March	445	161	243	2.67	3.08	14,900	A.
April	1,660	234	451	4.96	5.53	26,800	A.
May	1,280	218	385	4.23	4.88	23,700	A.
June	675	330	452	4.97	5.54	26,900	A.
July	922	403	635	6.98	8.05	39,000	A.
August	954	479	727	7.99	9.21	44,700	A.
September	506	194	300	3.30	3.68	17,900	A.
The year	1,660	112	409	4.49	61.01	296,000	

PUYALLUP RIVER AT ALDERTON, WASH.

Location.—On township line between sec. 25, R. 4 E., and sec. 30, R. 5 E., T. 20 N., at county bridge No. 78, 1¾ miles above Stuck River, 1 mile north of Alderton, in Pierce County.

Drainage area.—410 square miles (measured on drainage map published in Water Supply Paper 313).

Records available.—November 20, 1914, to September 30, 1915.

Gage.—Vertical staff attached to downstream side of north pier of county bridge, right bank; read once daily to hundredths by the following observers: November 20, 1914, to August 15, 1915, E. W. MacMorran; August 16, to September 30, Mrs. E. W. MacMorran.

Discharge measurements.—Made from bridge at gage.

Channel and control.—Composed of silt and gravel; shifting at all stages. Right bank subject to overflow at about gage height 8 feet; left bank high, not subject to overflow.

Extremes of discharge.—Maximum stage recorded during year, 5.2 feet at 8 a. m. May 28 (discharge, 4,690 second-feet); minimum stage recorded, 1.90 feet December 22 and 24, September 29–30 (discharge, 390 second-feet).

Winter flow.—Stage-discharge relation not affected by ice.

Diversions.—None.

Regulation.—The operation of Puget Sound Traction, Light & Power Co.'s hydroelectric plant at Electron does not materially affect the stage, pondage available is small.

Accuracy.—Results excellent. Slight diurnal fluctuation during summer months.

Cooperation.—Gage-height record and results of frequent discharge measurements furnished by Inter-County River Improvement Commission of King and Pierce counties.

Discharge measurements of Puyallup River at Alderton, Wash., during the years ending Sept. 30, 1914–15.

Date.	Made by—	Gage height.	Discharge.	Date.	Made by—	Gage height.	Discharge.
1913–14.		*Feet.*	*Sec.-ft.*	1914–15		*Feet.*	*Sec.-ft.*
Feb. 19	Parker and Roberts	2.77	1,120	Dec. 18	E. I. Anderson	1.98	414
23	Anderson and Phillips	3.03	1,370	Jan. 19	Anderson and Roberts	2.60	1,010
Mar. 31	Anderson and Bullard	2.81	1,170	Mar. 5	Parker and Anderson	2.48	850
June 13	do	3.06	1,320	Apr. 3	Anderson and Bullard	4.67	3,750
				9	J. T. Hartson	3.02	1,320
1914–15.				9	E. I. Anderson	3.02	1,350
				28	Hartson and Murray	2.34	782
Nov. 16	Anderson and Sutherland	3.56	1,970	June 4	Murray and Tuttle	3.16	1,650
19	E. I. Anderson	3.02	1,390	30	O. G. Murray	2.75	1,170
				Aug. 17	J. T. Hartson	2.71	1,090
30	Anderson and Sutherland	2.74	1,150	Sept. 16	O. G. Murray	2.05	538
Dec. 8	E. I. Anderson	2.36	722				

Daily discharge, in second-feet, of Puyallup River at Alderton, Wash., for the year ending Sept. 30, 1915.

Day.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May.	June.	Aug.	Sept.
1		980	880	690	690	830	690	1,690		780
2		980	930	690	650	3,670	690	2,210		690
3		930	930	780	690	3,990	690	1,950		690
4		880	1,040	690	690	2,900	650	1,620		880
5		830	1,040	690	880	2,160	650	1,560		830
6		780	980	780	735	1,780	610	1,500	1,440	690
7		780	980	780	735	1,660	735	1,440	1,320	530
8		735	1,440	780	735	1,670	930	1,380	1,140	610
9		650	1,620	690	735	1,360	1,040	1,320	1,200	780
10		610	1,690	780	650	1,290	1,260	1,090	1,260	610
11		610	1,620	780	610	1,170	1,090	1,040	1,440	530
12		610	1,820	690	610	1,270	880	980	1,260	780
13		630	1,560	690	610	1,280	780	980	1,140	610
14		530	1,560	690	600	1,080	830	980	1,200	460
15		530	1,440	610	1,200	1,080	735	1,040	1,200	460
16		460	1,200	610	1,440	970	690	1,090	1,320	460
17		460	1,090	610	1,200	1,020	690	1,090	1,090	570
18		460	980	610	1,260	1,150	780	980	1,040	650
19		425	930	610	1,090	1,090	930	980	1,140	690
20	3,510	610	930	610	980	930	980	980	1,320	780
21	2,750	650	930	610	980	890	880	980	1,440	650
22	2,210	390	830	610	980	800	880	930	1,500	610
23	1,820	425	735	610	1,200	740	880	1,090	1,440	570
24	1,560	390	735	530	1,090	710	880	1,200	1,500	460
25	1,440	425	735	690	980	750	980	980	1,440	460
26	1,560	530	690	690	830	690	1,090	980	1,320	530
27	1,440	690	570	570	735	670	1,260	930	1,320	610
28	1,320	980	610	610	690	690	4,690	1,090	1,200	460
29	1,200	735	610		690	735	2,610	1,090	1,140	390
30	1,140	890	610		880	780	1,950	1,090	1,560	390
31		890	650		880		1,500		1,090	

NOTE.—Discharge ascertained from rating curve well defined between 600 and 5,000 second-feet, except that for Apr. 4–27, which was determined by methods devised for shifting control. Discharge estimated, for lack of gage readings, by comparative hydrograph with Puyallup River at Puyallup, Wash., July 1–31, 1,380 second-feet; Aug. 1–5, 1,430 second-feet.

Monthly discharge of Puyallup River at Alderton, Wash., for the year ending Sept. 30, 1915.

[Drainage area, 410 square miles.]

Month.	Discharge in second-feet.				Run-off.		Accuracy.
	Maximum.	Minimum.	Mean.	Per square mile.	Depth in inches on drainage area.	Total in acre-feet.	
November 20-30	3,510	1,140	1,810	4.41	1.80	39,500	A.
December	980	390	657	1.60	1.84	40,400	A.
January	1,820	570	1,040	2.54	2.93	64,000	A.
February	780	530	671	1.64	1.71	37,300	A.
March	1,440	610	865	2.11	2.43	53,200	A.
April	3,990	670	1,330	3.24	3.62	79,100	C.
May	4,690	610	1,090	2.66	3.07	67,000	A.
June	2,210	930	1,210	2.95	3.29	72,000	A.
July			1,380	3.37	3.88	84,800	C.
August		1,040	1,310	3.20	3.69	80,600	A.
September	880	390	607	1.48	1.65	36,100	A.
The period						654,000	

PUYALLUP RIVER AT PUYALLUP, WASH.

Location.—In sec. 21, T. 20 N., R. 4 E. Willamette meridian, 1,000 feet upstream from Puget Sound Electric Co.'s railway bridge, 1 mile north of Puyallup, 1¼ miles below mouth of Stuck River, in Pierce County.

Drainage area.—914 square miles (measured on drainage map published in Water-Supply Paper 313).

Records available.—May 1, 1914, to September 30, 1915.

Gage.—Stevens water-stage recorder, in wooden shelter, attached to pile wing wall, 1,000 feet upstream from Puget Sound Electric Co.'s railway bridge.

Discharge measurements.—Made from cable 1,200 feet below gage.

Channel and control.—Stream bed at gage and cable composed of very light, alluvial silt; shifting at all stages. No well-defined control.

Extremes of discharge.—1914–15: Maximum stage recorded, 26.60 feet, as indicated by vertical line on gage-height chart during period when clock was not running, probably on November 3, 1914, as shown on a comparative hydrograph (discharge, 9,390 second feet); minimum stage recorded, 20.90 feet at 5 a. m. December 21, 1914 (discharge, 1,040 second-feet).

Winter flow.—Stage-discharge relation not affected by ice.

Diversions.—Water for two hydroelectric plants, both owned by the Puget Sound Traction, Light & Power Co., is diverted above this station. Water for Electron plant is diverted from Puyallup River 11 miles above Electron into an equalizing basin of 185 acre-feet capacity and is returned, after use, directly to the river. Water for plant at Dieringer is taken from White River near Buckley, is stored in Lake Tapps (capacity, 51,000 acre-feet), and after use is returned to Stuck River, which now carries the natural flow of White River.

Regulation.—See "Diversions."

Accuracy.—Results good except for periods in which gage was not read. Diurnal fluctuation during the low-water season is due to melting glaciers and regulation for power plants.

Cooperation.—Gage-height record and some discharge measurements furnished by Inter-County River Improvement Commission of King and Pierce counties.

Discharge measurements of Puyallup River at Puyallup, Wash., during the years ending Sept. 30, 1914–15.

Date.	Made by—	Gage height.	Discharge.	Date.	Made by—	Gage height.	Discharge.
1913–14.		*Feet.*	*Sec.-ft.*	1914–15.		*Feet.*	*Sec.-ft.*
Feb. 19	Parker and Collier	23.28	2,340	Mar. 5	Parker and Anderson	22·12	1,660
May 15	Parker and Brown	25.39	5,030	Apr. 3	Hartson and Murray	26.51	8,330
July 10	I. L. Collier	23.61	2,870	27	.....do	22.28	1,760
31	.....do	22.74	2,160	May 17	Murray and Hartson	22.36	1,870
Aug. 27	J. T. Hartson	22.08	1,810	June 4	Murray and Tuttle	23.70	3,230
28	.....do	22.04	1,770	15	G. L. Parker	23.12	2,590
Sept. 16	Parker and Hartson	21.88	1,800	July 1	O. G. Murray	23.23	2.590
20	Parker and Tuttle	22.16	1,920	15	J. T. Hartson	22.93	2,290
				Aug. 3	O. G. Murray	23.60	2,930
1914–15.				16	J. T. Hartson	22.52	2,040
Nov. 4	Hartson and Tuttle	25.04	6,180	Sept. 2	.....do	22.12	1,680
9	Hartson and Collier	23.40	3,130	15	O. G. Murray	21.57	1,250
Dec. 15	Hartson and Murray	21.72	1,490				

Daily discharge, in second-feet, of Puyallup River at Puyallup, Wash., for the years ending Sept. 30, 1914–15.

Day.	May.	June.	July.	Aug.	Sept.	Day.	May	June	July	Aug.	Sept.
1914.						1914.					
1	3,070	3,510	2,970	2.150	1,590	17	3,750	4,370	2.520	2,150	1,580
2	3,290	4,110	3,180	2,090	1,690	18	3,510	3,870	2,600	2,150	2,100
3	3,750	4,110	3,180	2.090	1,800	19	3,510	3,750	2,690	2,130	2,400
4	3,750	3,510	3,180	2,220	1,730	20	3,400	3.400	2,780	1,860	2,000
5	3,400	2,970	2,600	2,090	1,500						
						21	3,510	2,870	2,360	1,860	1,910
6	3,290	2,690	2,520	2,220	1,510	22	3,750	2,780	2,220	1,810	1,620
7	3,180	2,870	2,780	2,090	1,520	23	3,750	2,520	2,220	1,760	1.510
8	2,870	3,510	2,870	2,090	1,520	24	3.870	2,480	2,220	1,760	1,510
9	2,970	3,510	2,870	2,030	1,530	25	3,870	3,510	2,220	1,760	1,740
10	2,870	3,070	2,780	1,970	1,440						
						26	3,510	3,290	2,000	1,810	1,580
11	3,070	2,970	2,780	1,970	1,510	27	3,290	3,180	1,970	1,810	1,440
12	3,070	2,970	2,870	2,030	1,480	28	3,070	2,540	2,030	1,760	1,370
13	4,110	3,290	2,970	2,090	1,340	29	2,970	2,600	1,970	1,760	1,370
14	4,780	3,290	2,780	2,090	1,550	30	2,870	2,690	2,030	1,740	1,370
15	5,060	3,750	2,690	2,090	1,980	31	2,870	....	2,090	1,660	....
16	4,500	4,060	2,520	1,970	1,740						

Daily discharge, in second-feet, of Puyallup River at Puyallup, Wash., for the years ending Sept. 30, 1914–15—Continued.

Day.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.
1914–15.												
1	1,370	3,150	2,090	1,860	1,560	1,340	2,040	1,710	3,380	2,560	2,500	1,710
2	1,480	6,000	2,040	1,960	1,610	1,380	6,170	1,590	3,990	2,730	2,790	1,590
3	1,440	8,800	1,960	2,020	1,610	1,380	8,040	1,670	3,680	2,910	2,980	1,550
4	1,280	6,000	1,860	2,190	1,640	1,540	6,260	1,630	3,310	3,040	2,450	1,670
5	1,280	7,370	1,820	2,000	1,690	1,590	4,940	1,630	3,240	2,910	2,340	1,480
6	1,310	7,590	1,660	2,040	1,880	1,480	4,070	1,670	3,240	3,040	2,560	1,380
7	1,310	5,570	1,660	2,000	1,620	1,410	3,990	1,790	3,380	3,040	2,450	1,410
8	1,310	4,420	1,700	2,690	1,590	1,410	3,750	1,920	3,240	2,790	2,100	1,520
9	1,580	3,340	1,700	2,800	1,580	1,410	3,170	2,100	2,850	2,790	2,190	1,590
10	2,070	3,740	1,620	2,440	1,620	1,380	2,850	2,620	2,790	2,240	2,240	1,410
11	2,980	4,260	1,620	2,970	1,570	1,380	2,730	2,500	2,620	1,960	2,300	1,340
12	2,960	4,830	1,540	3,020	1,500	1,340	2,790	2,190	2,400	2,180	2,140	1,410
13	2,680	7,310	1,400	2,950	1,490	1,310	2,850	2,050	2,300	2,120	1,920	1,380
14	2,100	6,200	1,440	2,880	1,350	1,340	2,620	2,000	2,340	2,340	2,000	1,310
15	1,950	5,570	1,510	2,580	1,340	2,020	2,450	1,870	2,450	2,400	1,960	1,250
16	1,960	4,830	1,480	2,290	1,380	2,450	2,450	1,710	2,560	2,500	1,960	1,280
17	1,660	4,310	1,440	2,040	1,440	2,050	2,560	1,790	2,620	3,260	2,000	1,350
18	1,860	3,980	1,440	2,000	1,480	1,960	2,500	2,190	2,400	2,620	2,000	1,420
19	2,450	3,670	1,440	1,940	1,380	1,790	2,560	2,240	2,300	2,450	2,140	1,440
20	2,150	5,920	1,310	1,890	1,380	1,590	2,620	2,190	2,340	2,560	2,140	1,410
21	2,000	5,950	1,290	1,840	1,280	1,480	2,400	2,050	2,190	2,850	2,140	1,440
22	1,900	4,830	1,370	1,750	1,340	1,590	2,240	2,000	2,300	2,910	2,340	1,380
23	1,840	4,480	1,370	1,670	1,340	1,830	2,050	1,960	2,450	2,670	2,560	1,340
24	1,820	3,980	1,440	1,510	1,340	1,920	1,920	2,000	2,500	2,560	2,620	1,340
25	1,800	3,900	1,280	1,540	1,410	2,050	1,750	2,140	2,300	2,450	2,500	1,190
26	1,800	3,980	1,500	1,580	1,380	1,870	1,710	2,140	2,340	2,340	2,450	1,340
27	1,790	3,740	1,510	1,500	1,340	1,710	1,710	2,710	2,620	2,300	2,670	1,280
28	1,770	2,590	1,720	1,530	1,280	1,520	1,710	6,410	2,340	2,190	2,910	1,280
29	1,770	2,190	1,660	1,490	....	1,630	1,870	4,760	2,340	2,340	2,670	1,250
30	2,000	2,190	1,620	1,440	....	1,870	1,870	3,600	2,340	2,450	2,240	1,480
31	2,300	....	1,800	1,340	....	1,870	....	3,240	....	2,670	1,920	....

NOTE.—Discharge ascertained as follows: May 1 to Aug. 28, 1914, from a rating curve well defined between 1,700 and 5,500 second-feet; Aug. 29 to Sept. 20, 1914, by methods devised for shifting control; Sept. 21, 1914, to Jan. 8, 1915, from rating curve well defined between 1,500 and 7,000 second-feet; Jan. 9, to Feb. 15, 1915, by methods devised for shifting control; Feb. 16 to Sept. 30, 1915, from a rating curve well defined between 1,200 and 18,000 second-feet; June 16, 1914, by interpolation; Oct. 13–15, Oct. 18 to Nov. 4, 1914, and Sept. 16–19, 1915, estimated by hydrographic comparison with Puyallup River near Electron and combined flow of White River and flume at Buckley.

Monthly discharge of Puyallup River at Puyallup, Wash., for the years ending Sept. 30, 1914–15.

Month.	Discharge in second-feet.			Run-off (total in acre-feet).	Accuracy.
	Maximum.	Minimum.	Mean.		
1914.					
May	5,060	2,870	3,500	215,000	B.
June	4,370	2,480	3,270	195,000	B.
July	3,180	1,970	2,560	157,000	B.
August	2,220	1,660	1,970	121,000	B.
September	2,400	1,340	1,630	97,000	B.
The period				785,000	
1914–15.					C.
October	2,980	1,280	1,870	115,000	B.
November	[a] 8,800	2,190	4,820	287,000	B.
December	2,090	1,280	1,590	97,800	B.
January	3,020	1,340	2,060	127,000	B.
February	1,880	1,280	1,480	82,200	B.
March	2,450	1,310	1,640	101,000	B.
April	8,040	1,710	3,020	180,000	B.
May	6,410	1,590	2,320	143,000	B.
June	3,990	2,190	2,700	161,000	B.
July	3,260	1,960	2,590	159,000	B.
August	2,980	1,920	2,330	143,000	B.
September	1,710	1,190	1,410	83,900	
The year	[a]8,800	1,190	2,320	1,680,000	

[a] Determined by hydrographic comparison of records for White River at Buckley, Wash., and Puyallup River near Electron, Wash.

WHITE RIVER AT BUCKLEY, WASH.

Location.—In the SE. ¼ sec. 34, T. 20 N., R. 6 E., at Northern Pacific Railway bridge about a mile northeast of Buckley, in Pierce County.

Drainage area.—424 square miles (measured on Pl. XI, Water-Supply Paper 313).

Records available.—April 22, 1899, to August 31, 1903 (gage-height record only January 1, 1902, to August 31, 1903); June 8, 1910, to December 31, 1911 (records June 8, to September 30, 1910, taken from observations on the gage opposite Mud Mountain about 5 miles upstream); January 18, 1913, to September 30, 1915.

Gage.—Since January 18, 1913, Fuller water-stage recorder on left bank at downstream end of concrete wing wall protecting left abutment of railroad bridge. April 22, 1899, to December 31, 1902, wire and weight gage on guard rail of highway bridge 500 feet above railroad bridge; January 1 to August 31, 1903, various temporary gages. October 1, 1910, to December 31, 1911, inclined staff bolted to concrete wing wall about 15 feet above present gage, at a datum 0.7 foot higher.

Discharge measurements.—Made from downstream side of railway bridge.

Channel and control.—One channel at all stages; small bowlders and gravel; shifting; steep gradient. Right bank low and flat; left bank protected by concrete wing wall.

Extremes of discharge.—Maximum estimated combined discharge of river and flume during year, from water-stage recorder, 4,310 second-feet at 6 a. m. November 3; minimum discharge (river and flume) for one day, 429 second-feet September 28–29.

1899–1901; 1911; and 1913–15: Maximum discharge 14,600 second-feet, November 22, 1901; minimum discharge (including flume) 390 second-feet October 3–4, and 19–26, 1911.

Winter flow.—Stage-discharge relation not affected by ice.

Diversions.—White River flume diverts from river about a mile above gage. Total monthly discharge is computed from the combined flow of river and canal.

Accuracy.—Determination of daily discharge subject to considerable error for low-water periods, for which rating curve is not well defined. Record of combined discharge of river and flume good.

Cooperation.—Records of gage height and some discharge measurements furnished by Puget Sound Traction, Light & Power Co.

Discharge measurements of White River at Buckley, Wash., during the year ending Sept. 30, 1915.

Date.	Made by—	Gage height.	Discharge.	Date.	Made by—	Gage height.	Discharge.
		Feet.	*Sec.-ft.*			*Feet.*	*Sec.-ft.*
Nov. 11	Eernisse and Osgood...	6.68	1,330	July 6	Eernisse and Osgood...	6.10	768
Dec. 3	.....do..................	4.27	14.2	Aug. 14	A. H. Tuttle............	4.50	26.6
Jan. 11	Flaherity and Eernisse.	4.42	21.6	14	.....do..................	4.50	25.9
Apr. 3	A. H. Tuttle............	7.34	2,650	Sept. 17	Eernisse and Osgood...	4.18	11.2
May 26	Eernisse and Osgood...	5.83	515				

Daily discharge, in second-feet, of White River at Buckley, Wash., for the year ending Sept. 30, 1915.

Day.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.
1	12	31	23	19	10	14	746	320	1,110	624	435	15
2	14	334	21	20	11	14	2,380	340	1,050	671	489	11
3	12	2,320	17	21	12	14	2,700	356	1,130	696	539	10
4	11	2,080	13	21	13	15	2,380	315	1,050	721	395	11
5	11	3,020	11	21	13	15	1,900	290	1,070	705	353	11
6	11	3,020	9	20	13	15	1,570	295	1,170	747	390	11
7	11	2,070	14	19	13	15	1,430	362	1,260	579	342	10
8	217	1,110	12	23	12	15	1,280	462	1,140	593	308	12
9	429	904	12	22	11	15	1,080	640	976	543	262	17
10	720	1,160	12	22	11	15	965	838	875	373	232	11
11	928	827	13	23	11	15	924	773	755	340	230	11
12	426	996	13	33	11	15	944	632	705	542	156	11
13	18	1,750	13	28	11	15	944	550	755	465	28	11
14	14	1,430	13	27	11	23	856	543	764	423	26	10
15	12	1,990	13	25	11	310	782	364	738	526	26	10
16	9	1,690	12	21	11	386	782	419	800	600	61	10
17	12	1,430	11	21	10	156	800	481	810	486	215	11
18	11	1,320	11	15	10	153	819	586	713	445	180	10
19	24	1,280	10	14	10	56	846	616	655	553	164	10
20	19	1,840	9	13	10	23	856	564	609	566	51	10
21	11	1,830	9	13	11	21	764	508	593	650	384	10
22	11	1,560	10	12	11	85	663	521	671	680	288	10
23	10	1,390	10	11	11	258	564	495	764	593	303	10
24	10	1,280	10	11	12	415	441	488	755	526	318	9
25	10	1,190	10	10	13	543	395	508	655	470	248	9
26	10	1,200	13	10	13	401	346	550	632	429	252	10
27	9	842	14	9	13	310	335	850	773	384	502	10
28	9	83	15	9	14	290	330	1,900	688	353	721	9
29	9	56	14	9	....	330	384	1,570	598	384	442	9
30	9	34	14	9	....	395	373	1,220	564	433	20	9
31	9	....	17	9	....	368	....	1,090	....	429	17	....

NOTE.—Discharge ascertained as follows: Oct. 1 to Nov. 6, and July 13 to Sept. 30, from rating curve fairly well defined between 60 and 1,200 second-feet; Nov. 7 to July 12, from rating curve well defined between 500 and 3,000 second-feet.

Monthly discharge of White River at Buckley, Wash., for the year ending Sept. 30, 1915.

Month.	Discharge in second-feet.			Run-off (total in acre-feet).	Accuracy.
	Maximum.	Minimum.	Mean.		
October	928	9	97.7	6,010	D.
November	3,020	31	1,340	79,700	A.
December	23	9	12.8	787	D.
January	33	9	17.4	1,070	D.
February	14	10	11.5	639	C.
March	543	14	152	9,350	B.
April	2,700	330	986	58,700	A.
May	1,900	290	627	38,600	A.
June	1,260	564	828	49,300	A.
July	747	340	533	32,800	B.
August	721	17	270	16,600	B.
September	17	9	10.6	631	C.
The year	3,020	9	406	294,000	

Combined monthly discharge of White River and flume at Buckley, Wash., for the year ending Sept. 30, 1915.

[Drainage area, 424 square miles.]

Month.	Discharge in second-feet.				Run-off.		Accuracy.
	Maximum.	Minimum.	Mean.	Per square mile.	Depth in inches on drainage area.	Total in acre-feet.	
October	1.000	439	667	1.57	1.81	41.000	B.
November	3,570	881	1,800	4.25	4.74	107,000	B.
December	870	442	602	1.42	1.64	37,000	B.
January	793	533	659	1.55	1.79	40.500	B.
February	701	575	626	1.48	1.54	34,800	B.
March	1,260	647	873	2.06	2.38	53,700	B.
April	3,210	976	1,540	3.63	4.05	91.600	B.
May	2,560	905	1,230	2.90	3.34	75,600	B.
June	1,840	1,170	1,400	3.30	3.68	83,300	B.
July	1,390	916	1,150	2.71	3.12	70,700	B.
August	1,220	750	931	2.20	2.54	57,200	B.
September	821	429	553	1.30	1.45	32,900	B.
The year	3,570	429	1,000	2.36	32.08	725,000	

WHITE RIVER FLUME AT BUCKLEY, WASH.

Location.—In sec. 35, T. 20 N., R. 6 E. Willamette meridian, a quarter of a mile below intake on left side of White River, three-eighths of a mile above Northern Pacific Railway crossing, and 1 mile northeast of Buckley, in Pierce County.

Records available.—January 18, 1913, to September 30, 1915.

Gage.—Fuller water-stage recorder on right side of flume, a quarter of a mile below intake.

Discharge measurements.—Made from footbridge across flume 8 feet below gage.

Channel and control.—Formed by a long section of flume bottom below gage. Stage-discharge relation is affected by variable quantity of silt deposited near end of flume about three-fourths of a mile below gage. Zero of gage is at same elevation as bottom of flume.

Extremes of discharge.—Maximum stage during year from water-stage recorder, 5.57 feet from 3 p. m. to 5 p. m. November 11 (discharge, 1,480 second-feet); minimum stage from recorder, 0.13 foot from 7 a. m. to 1.30 p. m. August 27 (discharge, 6 second-feet).

1913–1915: Maximum stage recorded, 5.55 feet, June 8, 1913 (discharge, 1,660 second-feet [1]); minimum stage recorded on August 27, 1915.

Winter flow.—Stage-discharge relation slightly affected by ice December 11–23; flow estimated from study of fluctuations on record sheets and records of maximum and minimum temperature at Weather Bureau station at intake.

Diversion.—None.

Regulation.—Gates at intake of flume are operated frequently to control flow.

Accuracy.—Results good.

Cooperation.—Records of gage height and some discharge measurements furnished by Puget Sound Traction, Light & Power Co.

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[1] Estimated from rating curve poorly defined for high stages; probably about 12 per cent high.

Discharge measurements of White River flume at Buckley, Wash., during the year ending Sept. 30, 1915.

Date.	Made by—	Gage height.	Discharge.	Date.	Made by—	Gage height.	Discharge.
		Feet.	*Sec.-ft.*			*Feet.*	*Sec.-ft.*
Apr. 3	Tuttle and Eerinsse....	2.83	518	Aug. 7	Tuttle and Eernisse....	3.22	595
July 6	Osgood and Eernisse...	3.34	610	7	Eernisse and Tuttle....	3.20	601
22	Eernisse and Lockridge.	3.28	610	Sept. 17	Osgood and Eernisse...	2.82	515

Daily discharge, in second-feet, of White River flume at Buckley, Wash., for the year ending Sept. 30, 1915.

Day.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.
1	480	946	847	760	591	674	564	646	563	616	602	688
2	608	1,140	818	731	578	646	591	646	576	616	616	591
3	561	1,250	789	716	578	646	510	660	563	643	616	618
4	502	701	731	702	564	760	510	646	563	643	602	660
5	488	19	702	600	578	731	497	646	563	643	602	688
6	473	21	688	646	674	716	484	646	576	643	602	591
7	473	221	660	632	632	716	484	660	576	630	602	524
8	261	584	646	760	632	702	484	674	563	630	602	604
9	10	528	618	731	660	674	484	716	563	616	656	804
10	10	175	604	760	688	688	484	632	563	602	724	578
11	10	1,350	556	760	660	660	484	524	563	576	724	537
12	516	1,350	529	760	632	646	484	524	563	394	779	564
13	880	1,280	502	731	632	632	497	510	563	567	835	497
14	750	920	484	702	591	760	497	510	563	724	863	471
15	686	18	524	674	578	847	497	619	550	602	863	458
16	686	18	484	618	578	876	497	486	563	602	807	484
17	847	44	446	604	604	905	524	537	549	710	656	524
18	782	18	458	604	632	905	578	589	589	724	643	550
19	979	18	497	618	591	905	578	602	576	602	697	550
20	913	63	433	632	578	847	591	589	576	602	863	537
21	782	22	433	618	591	876	591	589	576	616	835	550
22	686	18	492	578	591	905	591	589	563	616	656	524
23	623	19	484	591	564	905	591	589	563	616	656	510
24	592	20	510	578	578	767	632	589	576	602	656	484
25	592	21	524	537	688	578	660	589	563	602	616	484
26	561	21	604	524	632	578	632	602	563	602	630	484
27	546	326	618	524	632	564	646	616	589	589	248	458
28	531	934	660	550	674	578	646	656	576	589	90	420
29	531	905	604	537	....	578	660	565	587	589	453	420
30	608	847	604	524	....	537	660	563	616	630	891	433
31	686	....	702	537	....	537	....	563	....	602	789	....

NOTE.—Discharge ascertained from rating curves fairly well defined above 125 second-feet: Oct. 1; Oct. 2 to Nov. 12; Nov. 13 to May 15; May 16 to Aug. 30; Aug. 31 to Sept. 30. Days during which the range in stage exceeded that permissible for using the mean gage height for the day to obtain the true discharge within 2 per cent, were subdivided and the discharge was weighted according to the time interval of subdivided parts. Discharge relation affected by ice Dec. 11 to 23. Flow estimated from a study of fluctuations on record sheets and maximum and minimum temperatures at Weather Bureau station at intake.

Monthly discharge of White River flume at Buckley, Wash., for the year ending Sept. 30, 1915.

Month.	Discharge in second-feet.			Run-off (total in acre-feet).	Accuracy.
	Maximum.	Minimum.	Mean.		
October	979	10	569	35,000	B.
November	1,350	18	460	27,400	B.
December	847	433	589	36,200	B.
January	760	524	642	39,500	B.
February	688	564	614	34,100	B.
March	905	537	721	44,300	B.
April	660	484	554	33,000	B.
May	716	486	599	36,800	B.
June	616	549	570	33,900	B.
July	724	394	614	37,800	B.
August	891	90	660	40,600	B.
September	804	420	543	32,300	B.
The year	1,350	10	595	431,000	

CEDAR RIVER AT CEDAR FALLS, WASH.

Location.—In sec. 4, T. 22 N., R. 8 E., below Cedar Falls, in King County, 3½ miles below Cedar Lake, and 3½ miles above Taylor Creek.

Drainage area.—83 square miles (measured on topographic maps).

Records available.—April 9, 1914, to September 30, 1915.

Gage.—Stevens water-stage recorder installed April 8, 1914, 0.7 mile below Seattle municipal power plant at Cedar Falls; referred to inclined and vertical staff on right bank. Recorder inspected by G. H. Moore.

Discharge measurements.—Made from cable 90 feet below gage or by wading.

Channel and control.—Small bowlders and gravel; likely to shift at extremely high water. One channel at all stages. Stage of zero flow, at about gage height 3.5 feet.

Extremes of discharge.—Maximum stage during period, from water-stage recorder, 6.65 feet at 8.30 p. m. April 15, 1914 (discharge, 1,160 second-feet); minimum stage, from water-stage recorder, 3.85 feet at 6.30 p. m. August 29, 1915 (discharge, approximately 3.5 second-feet).

Winter flow.—Stage-discharge relation not affected by ice.

Diversions.—None.

Regulation.—Flow partly controlled by storage and release of water in Cedar Lake reservoir to accommodate requirements of Seattle municipal power plant.

Accuracy.—Rating curve well defined above 35 second-feet. Daily discharge determined with discharge integrator. Results excellent except those for periods during which water-stage recorder was not operating satisfactorily.

Cooperation.—Gage-height record and most of discharge measurements furnished by city engineer of Seattle.

Discharge measurements of Cedar River at Cedar Falls, Wash., during the years ending Sept. 30, 1914–15.

Date.	Made by—	Gage height.	Discharge.	Date.	Made by—	Gage height.	Discharge.
1914.		*Feet.*	*Sec.-ft.*	1914–15.		*Feet.*	*Sec.-ft.*
Mar. 27	Moore and Ballard	5.65	481	Dec. 3	Moore and Shinkle	5.17	255
Apr. 9	Moore and Shinkle	5.77	535	Apr. 9	Parker and Moore	5.87	612
May 21	.....do	5.74	524	14	G. H. Moore	4.60	94.7
June 19	.....do	5.32	329	May 7	.....do	4.43	59.6
July 14	.....do	5.07	198	21	.....do	4.26	34.7
25	.....do	4.83	135	June 29	C. G. Paulsen	4.53	76.7
Aug. 11	.....do	4.97	184	29	.....do	4.52	74.6
28	Shinkle and Beals	4.92	163				

Daily discharge, in second-feet, of Cedar River at Cedar Falls, Wash., for the years ending Sept. 30, 1914–15.

Day.	Apr.	May.	June.	July.	Aug.	Sept.
1914.						
1	......	438	370	232	167	172
2	......	300	410	228	142	178
3	......	336	426	225	161	173
4	......	524	426	200	178	178
5	......	553	394	188	167	176
6	......	549	331	206	187	145
7	......	553	336	193	175	138
8	......	504	458	182	165	143
9	554	378	484	203	132	153
10	598	432	466	199	155	146
11	625	509	437	198	170	160
12	608	544	454	150	173	148
13	690	610	454	196	172	105
14	808	716	410	206	172	130
15	990	786	411	200	174	161
16	1,060	745	394	194	148	114
17	938	666	376	195	169	116
18	810	625	338	193	178	137
19	744	574	316	172	176	130
20	811	546	274	196	177	101
21	761	552	281	194	176	130
22	700	575	276	169	174	158
23	614	586	300	166	142	216
24	565	550	290	185	168	187
25	510	558	288	187	186	190
26	474	536	283	150	182	164
27	536	498	264	159	166	94
28	530	450	243	164	161	135
29	507	408	242	162	172	116
30	500	348	248	156	131	129
31	......	326	......	156	166	......

Day.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.
1914–15.												
1	137	209	244	208	204	171	226	92	98	74	93	138
2	154	229	245	218	191	166	252	99	32	77	96	134
3	110	322	248	182	198	194	347	111	32	72	93	138
4	86	332	237	222	191	226	552	91	36	73	92	130
5	96	383	239	226	209	233	797	82	33	73	93	85
6	120	368	215	211	215	232	642	66	56	76	91	90
7	121	350	237	212	189	216	642	70	141	72	93	131
8	112	350	247	214	202	213	437	70	120	76	10	185
9	100	358	239	217	197	197	366	64	160	76	42	201
10	141	384	236	205	203	176	120	60	58	78	58	188
11	82	432	238	236	188	174	116	60	52	15	53	192
12	104	584	232	228	184	172	87	54	37	50	63	172
13	48	663	208	233	192	170	92	56	33	72	62	197
14	48	678	226	228	158	152	96	51	65	91	67	209
15	77	662	233	222	176	170	110	50	26	90	60	180
16	84	598	230	209	180	182	128	46	35	89	66	186
17	86	348	226	192	196	180	116	45	30	63	64	189
18	86	270	224	199	177	175	101	46	24	23	64	185
19	94	280	220	221	163	172	113	44	32	98	70	182
20	94	252	192	220	150	176	98	41	40	102	81	195
21	94	192	218	214	129	158	136	41	24	108	88	213
22	168	188	224	215	141	196	108	45	80	100	81	208
23	171	215	216	204	158	205	99	48	82	105	82	215
24	182	218	214	170	178	208	96	36	56	99	122	205
25	186	218	194	178	209	204	97	42	76	85	163	207
26	149	194	202	173	89	202	128	36	82	89	119	177
27	190	222	195	180	186	206	249	44	80	97	124	204
28	232	218	216	182	147	167	174	150	87	101	120	216
29	225	198	214	184	....	212	96	180	91	98	75	215
30	198	226	214	179	....	212	92	148	75	102	131	215
31	203	....	224	154	....	214	....	154	....	96	134	....

Note.—Water-stage recorder not operating satisfactorily May 30 to June 19, 21–22, Sept. 21–26, 1914, Jan. 5–11 to Mar. 3, 1915. Gage-height graph for these intervals determined by range in stage as shown by water-stage recorder and by comparison with recorder sheet for Cedar River near Landsberg, Wash.

Monthly discharge of Cedar River at Cedar Falls, Wash., for the years ending Sept. 30, 1914–15.

Month.	Discharge in second-feet.			Run-off (total in acre-feet).	Accuracy.
	Maximum.	Minimum.	Mean.		
1914.					
April 9–30	1,060	474	679	29,600	A.
May	786	300	525	32,300	A.
June	484	242	356	21,200	B.
July	232	150	187	11,500	A.
August	187	131	167	10,300	A.
September	216	94	147	8,750	A.
The period				114,000	
1914–15.					
October	232	48	128	7,870	A.
November	678	188	338	20,100	A.
December	248	192	224	13,800	A.
January	236	154	204	12,500	B.
February	215	89	179	9.940	C.
March	233	152	191	11,700	A.
April	797	87	224	13,300	A.
May	180	36	71.7	4,410	A.
June	160	24	62.4	3,710	A.
July	108	15	81.3	5,000	A.
August	163	10	85.5	5,260	A.
September	216	85	179	10,700	A.
The year	797	10	164	118,000	

CEDAR RIVER NEAR LANDSBERG, WASH.

LOCATION.—In sec. 17, T. 22 N., R. 7 E., 1¾ miles above Seattle water-supply intake at Landsberg, in King County, and about 5 miles below Taylor Creek.

DRAINAGE AREA.—135 square miles (measured on topographic maps).

RECORDS AVAILABLE.—April 30, 1914, to September 30, 1915. For station at Clifford Bridge, near Ravensdale, 2 miles below present gage, July 25, 1895, to September 30, 1898; at Seattle water-supply intake, near Ravensdale, 1¾ miles below present gage, March 24, 1901, to April 30, 1912. Early records not precisely comparable with those at present site, owing to small difference in drainage area.

GAGE.—Stevens water-stage recorder, installed April 29, 1914; referred to vertical staff on left bank.

DISCHARGE MEASUREMENTS.—Made from cable at gage or by wading.

CHANNEL AND CONTROL.—Large bowlders and gravel; apparently permanent control formed by section of stream bed and by a broad riffle about 1,200 feet below gage. One channel at all stages. Stage of zero flow, at about gage height 2.7 feet.

EXTREMES OF DISCHARGE.—Maximum stage during period, from water-stage recorder, 7.47 feet at 11.30 p. m. April 4, 1915 (discharge, 1,330 second-feet); minimum stage, from water-stage recorder, 4.35 feet at 1 a. m. October 15, 1914 (discharge, 162 second-feet).

WINTER FLOW.—Stage-discharge relation not affected by ice.

DIVERSIONS.—None.

REGULATION.—Flow partly controlled by storage and release of water in Cedar Lake reservoir to accommodate requirements of Seattle municipal power plant.

ACCURACY.—Rating curve well defined. Daily discharge determined with discharge integrator. Results excellent, except for periods in which water-stage recorder was not operating satisfactorily.

COOPERATION.—Gage-height record and most of discharge measurements furnished by city engineer of Seattle.

Discharge measurements of Cedar River near Landsberg, Wash., during the years ending Sept. 30, 1914–15.

Date.	Made by—	Gage height.	Discharge.	Date.	Made by—	Gage height.	Discharge.
1914.		*Feet.*	*Sec.-ft.*	1914–15.			
Mar. 24	Moore and Shinkle	6.65	952	Jan. 5	Moore and Shinkle	5.65	464
Apr. 15	Shinkle and Ballard	7.60	1,380	Apr. 10	C. G. Paulsen	5.33	411
May 21	Moore and Shinkle	6.25	774	May 20	Moore and Beals	4.79	257
June 19	....do	5.65	487	28	Paulsen and Beals	5.66	489
July 14	....do	5.20	370	28	C. G. Paulsen	5.64	491
24	....do	4.95	318	June 30	....do	5.25	383
Aug. 28	Shinkle and Beals	5.02	294				

Daily discharge, in second-feet, of Cedar River, near Landsberg, Wash., for the years ending Sept. 30, 1914–15.

Day.	Apr.	May.	June.	July.	Aug.	Sept.	Day.	Apr.	May.	June.	July.	Aug.	Sept.
1914.							1914.						
1	......	737	584	390	295	314	16	......	992	608	339	281	279
2	......	576	621	384	278	318	17	......	899	588	338	292	272
3	......	596	632	384	286	314	18	......	843	536	330	308	304
4	......	782	636	374	306	314	19	......	785	496	323	308	294
5	......	831	616	364	288	314	20	......	746	453	331	308	280
6	......	822	562	374	312	289	21	......	742	482	340	312	284
7	......	823	544	373	302	270	22	......	764	462	308	330	302
8	......	754	658	359	294	290	23	......	780	470	310	293	348
9	......	632	704	370	266	294	24	......	760	476	327	306	320
10	......	686	683	372	276	285	25	......	785	469	330	328	316
11	......	766	652	377	298	303	26	......	774	451	295	323	302
12	......	796	663	336	302	296	27	......	733	434	290	310	246
13	......	842	674	350	298	260	28	......	680	415	301	306	270
14	......	952	626	350	299	260	29	......	622	400	300	314	244
15	......	1,030	619	350	302	315	30	781	571	405	294	282	264
							31	......	556	......	291	304	......

Day.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.
1914–15												
1	272	400	486	575	532	485	558	284	432	367	329	315
2	312	514	488	562	520	482	827	293	339	362	324	311
3	253	686	485	495	526	478	958	302	331	354	321	310
4	234	688	464	524	518	528	1,070	281	326	352	316	310
5	216	814	454	506	566	528	1,240	278	329	347	306	275
6	252	804	432	494	575	506	1,020	271	330	356	309	258
7	261	707	448	500	526	493	1,040	267	454	350	305	270
8	240	665	454	576	532	477	765	266	410	354	241	369
9	226	658	446	614	527	468	716	266	456	350	233	401
10	314	652	442	565	531	430	396	270	364	346	258	376
11	262	838	438	756	517	425	380	270	348	296	249	360
12	266	993	426	780	500	416	354	262	339	314	260	355
13	226	1,170	398	720	516	408	360	256	325	354	258	372
14	186	1,110	418	696	470	421	352	262	326	434	252	382
15	216	1,040	428	661	492	480	344	258	346	400	251	350
16	216	982	413	601	500	462	360	260	334	408	250	354
17	262	698	413	550	510	446	344	261	335	481	252	358
18	271	519	414	547	505	440	328	268	320	380	244	348
19	355	544	408	566	488	425	330	269	330	408	251	350
20	335	602	376	559	479	418	316	268	352	402	252	354
21	288	488	404	540	456	403	342	261	316	392	270	374
22	344	466	412	548	464	434	314	265	360	377	270	368
23	323	484	412	536	488	447	298	284	374	366	261	368
24	356	465	401	498	496	448	297	264	348	360	294	360
25	348	464	392	508	542	438	294	274	372	349	350	358
26	316	472	417	498	360	430	292	300	378	354	300	332
27	334	474	418	506	502	426	433	348	379	352	297	349
28	379	464	498	506	466	390	393	578	365	352	306	366
29	374	455	468	507	......	430	288	556	364	348	278	358
30	388	470	490	508	......	446	291	486	370	346	292	362
31	372	......	582	464	......	442	......	466	......	339	309	......

NOTE.—Water-stage recorder not operating satisfactorily May 4, 8, 9, 12; June 8, 18, 19; July 12, 13, 14; Dec. 30, 31, 1914; Jan. 4, 5; Apr. 11, 13, 25; May 2, 16; Sept. 8, 12, 1915. Gage-height graph estimated except for Apr. 25, May 2, 16, 1915, when discharge was interpolated.

Monthly discharge of Cedar River near Landsberg, Wash., for the years ending Sept. 30, 1914–15.

Month.	Discharge in second-feet.			Run-off (total in acre-feet).	Accuracy.
	Maximum.	Minimum.	Mean.		
1914.					
May	1,030	556	763	46,900	B.
June	704	400	554	33,000	B.
July	390	290	340	20,900	A.
August	330	266	300	18,400	A.
September	348	244	292	17,400	A.
The period				137,000	
1914–15.					
October	388	186	290	17,800	B.
November	1,170	400	660	39,300	A.
December	582	376	440	27,100	A.
January	780	464	563	34,600	A.
February	575	360	504	28,000	A.
March	528	390	450	27,700	A.
April	1,240	288	510	30,300	A.
May	578	256	306	18,800	A.
June	456	316	358	21,300	A.
July	481	296	366	22,500	A.
August	350	233	280	17,200	A.
September	401	258	346	20,600	A.
The year	1,240	186	422	305,000	

SOUTH FORK OF SKYKOMISH RIVER NEAR INDEX, WASH.

LOCATION.—In the NE ¼ sec. 29, T. 27 N., R. 10 E., 300 feet above Sunset Falls, about 2 miles above town of Index and mouth of North Fork of Skykomish River, in Snohomish County.

DRAINAGE AREA.—351 square miles (measured on topographic and county maps).

RECORDS AVAILABLE.—October 7, 1902, to September 30, 1905; April 26, 1911, to October 21, 1912; June 14, 1913, to September 30, 1915.

GAGE.—April 19, 1914, to September 30, 1915, inclined and vertical staff at same location as gage used 1902 to 1905, but at datum 0.39 foot lower; read once a day to hundredths by M. J. Gruber. April 26, 1911, to February 25, 1914, vertical staff at same location but at datum 0.61 foot higher.

DISCHARGE MEASUREMENTS.—Made from cable 1 mile below gage.

CHANNEL AND CONTROL.—Control is Sunset Falls, 300 feet below gage; solid rock.

EXTREMES OF DISCHARGE.—Maximum stage recorded during year, 11.25 feet at 10.45 a. m. November 3 (discharge, 11,500 second-feet); minimum stage recorded, 0.54 foot, September 30 (discharge, 262 second-feet).

1902–1905; 1911–1915: Maximum stage recorded, 17.0 feet at 10.05 a. m. January 6, 1914 (discharge, 16,700 second-feet); minimum stage recorded on September 30, 1915.

WINTER FLOW.—Stage-discharge relation not affected by ice.

DIVERSIONS AND STORAGE.—None.

ACCURACY.—Results excellent. Stage-discharge relation unaffected by logs or ice; diurnal fluctuation not sufficient to materially affect accuracy of determinations based on one gage reading a day.

Discharge measurements of South Fork of Skykomish River near Index, Wash., during the year ending Sept. 30, 1915.

Date.	Made by—	Gage height.	Discharge.	Date.	Made by—	Gage height.	Discharge.
		Feet.	*Sec.-ft.*			*Feet.*	*Sec.-ft.*
Oct. 23	I. L. Collier	4.37	1,890	May 12	C. G. Paulsen	4.22	1,850
Feb. 11	J. T. Hartson	2.51	894	Aug. 23	.....do	1.08	397
11	.....do	2.49	863				

Daily discharge, in second-feet, of South Fork of Skykomish River near Index, Wash., for the year ending Sept. 30, 1915.

Day.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.
1	764	4,680	1,950	1,180	692	728	2,540	1,340	1,730	728	492	374
2	1,400	6,860	1,800	1,180	728	692	9,760	1,280	1,590	728	524	346
3	1,230	11,400	1,660	1,000	728	692	10,700	1,400	1,460	764	524	346
4	1,040	8,690	1,460	878	728	878	6,710	1,400	1,400	728	462	346
5	918	6,860	1,400	840	764	918	4,810	1,460	1,400	692	462	346
6	840	5,360	1,280	802	878	840	3,830	1,590	1,460	764	462	320
7	764	4,060	1,180	802	840	840	3,940	1,800	1,460	728	432	285
8	656	3,500	1,040	764	802	764	4,300	2,030	1,180	692	432	333
9	622	3,400	1,000	764	878	802	2,630	1,950	1,090	692	432	492
10	1,040	2,730	918	728	918	802	2,370	2,280	1,000	622	432	432
11	2,110	6,250	878	878	878	802	2,460	1,800	1,000	588	432	360
12	2,630	4,060	840	918	802	802	3,010	1,800	1,000	692	432	374
13	1,800	4,550	764	878	840	764	3,400	1,520	918	764	402	346
14	1,520	3,720	764	802	764	2,110	2,460	1,590	1,000	802	402	360
15	1,280	3,100	764	802	692	4,300	2,280	1,460	878	802	402	346
16	1,090	2,460	764	728	692	3,010	2,630	1,230	918	840	432	346
17	2,820	2,110	728	692	692	2,110	3,100	1,340	918	878	432	346
18	4,060	1,870	692	656	918	2,630	3,010	1,520	918	764	432	333
19	5,360	2,820	692	692	840	2,110	3,010	1,660	878	692	402	333
20	4,550	4,550	622	692	764	1,800	3,100	1,660	1,000	622	402	346
21	3,500	4,550	622	692	764	2,030	2,370	1,460	878	622	402	346
22	2,460	3,830	622	656	764	2,630	1,800	1,340	840	588	402	333
23	1,950	3,400	588	656	728	3,300	1,730	1,340	802	556	402	296
24	1,660	3,200	556	622	728	3,300	1,730	1,400	802	556	402	296
25	1,280	3,010	556	622	840	2,370	1,660	1,520	764	524	374	285
26	1,280	3,830	556	588	764	1,950	1,800	1,400	918	492	374	285
27	1,180	3,200	556	556	728	1,660	1,800	2,460	918	492	374	285
28	1,090	3,010	622	556	692	1,660	1,660	3,940	802	492	374	264
29	1,000	2,630	656	524	......	1,950	1,800	3,200	764	492	360	264
30	1,400	2,190	728	524	......	2,280	1,520	2,110	764	492	402	264
31	2,370	....	1,230	556	......	1,880	....	1,800	....	492	374	......

Note.—Discharge ascertained from a rating curve well defined between 300 and 13,000 second-feet. Oct. 21, gage not read; discharge interpolated.

Monthly discharge of South Fork of Skykomish River near Index, Wash., for the year ending Sept. 30, 1915.

[Drainage area, 351 square miles.]

Month.	Discharge in second-feet.				Run-off.		Accuracy.
	Maximum.	Minimum.	Mean.	Per square mile.	Depth in inches on drainage area.	Total in acre-feet.	
October	5,360	622	1,800	5.13	5.91	111,000	A.
November	11,400	1,870	4,200	12.0	13.39	250,000	A.
December	1,950	556	919	2.62	3.02	56,500	A.
January	1,180	524	749	2.13	2.46	46,100	A.
February	918	692	780	2.22	2.31	43,300	A.
March	4,300	692	1,720	4.90	5.65	106,000	A.
April	10,700	1,520	3,260	9.29	10.36	194,000	A.
May	3,940	1,230	1,740	4.96	5.72	107,000	A.
June	1,730	764	1,050	2.99	3.34	62,500	A.
July	878	492	657	1.87	2.16	40,400	A.
August	524	360	421	1.20	1.38	25,900	A.
September	492	264	334	0.952	1.06	19,900	A.
The year	11,400	264	1,470	4.19	56.76	1,060,000	

MILLER CREEK NEAR BERLIN, WASH.

Location.—In the NE. ¼ sec. 33, T. 26 N., R. 11 E., 1¼ miles south of Berlin, and mouth of the creek, in King County.

Drainage area.—44.2 square miles (measured on topographic maps).

Records available.—May 24, 1911, to September 30, 1915 (fragmentary).

Gage.—Since August 27, 1914, inclined staff on left bank; read once daily to hundredths by E. J. Moore. May 24, 1911, to August 26, 1914, vertical staff 10 feet upstream from present gage at same datum.

Discharge measurements.—Made from a cable 900 feet above the gage or by wading.

Channel and control.—Large boulders and gravel; practically permanent. A log jam 500 feet below gage, at a water-surface elevation about 5 feet lower than at gage, may affect stage-discharge relation at high stages.

Extremes of discharge.—Maximum stage recorded during year, 3.3 feet at 1.30 p. m. November 3 (discharge, 1,590 second-feet); minimum stage recorded, 0.07 foot August 31 (discharge, 24 second-feet).

1911–1915: Maximum stage recorded 5.5 feet November 18–19, 1911 (discharge 4,740 second-feet); minimum stage recorded, August 31, 1915.

Winter flow.—Stage-discharge relation not affected by ice.

Regulation.—None.

Diversions.—None.

Accuracy.—Results excellent when gage-height record is unbroken. Considerable diurnal fluctuation during summer low-water period.

Cooperation.—Gage-height record furnished by United States Forest Service.

Discharge measurements of Miller Creek near Berlin, Wash., during the year ending Sept. 30, 1915.

Date.	Made by—	Gage height.	Discharge.
		Feet.	*Sec.-ft.*
Feb. 10	J. T. Hartson	0.89	132
May 13	C. G. Paulsen	1.36	249
Aug. 24	....do	.11	25.9

Daily discharge, in second-feet, of Miller Creek near Berlin, Wash., for the year ending Sept. 30, 1915.

Day.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.
1	93	......	120	186	83	93	875	153	278	95	43	25
2	295	......	116	180	89	92	1,280	295	245	92	43	26
3	215	1,590	112	106	92	90	......	295	230	87	42	25
4	186	......	108	106	87	144	......	245	230	79	42	25
5	156	......	105	92	92	146	565	260	230	75	40	25
6	127	......	101	86	87	128	460	278	222	74	40	25
7	98	......	97	75	90	126	565	295	215	74	40	25
8	......	......	93	76	87	124	230	312	215	73	40	58
9	......	......	92	79	104	126	392	330	144	72	40	80
10	......	312	91	76	126	124	295	370	137	72	39	53
11	......	625	90	80	106	126	378	295	133	......	37	42
12	538	625	89	92	96	116	460	295	124	......	35	44
13	370	625	88	93	93	118	510	245	122	200	33	47
14	260	510	87	84	84	392	330	245	124	144	32	47
15	205	......	86	82	76	1,000	295	200	124	124	31	43
16	150	......	86	74	76	485	370	172	122	155	31	40
17	665	......	84	69	87	330	485	230	120	162	31	39
18	1,180	......	82	65	141	460	485	295	126	128	30	38
19	......	186	80	76	110	330	460	295	128	98	29	35
20	......	1,230	77	87	93	295	392	295	186	89	28	30
21	350	312	75	84	96	370	295	230	144	71	28	28
22	312	375	74	76	93	510	230	215	122	66	27	27
23	266	438	70	84	90	625	222	200	124	65	27	26
24	219	392	66	69	100	565	215	295	126	64	27	26
25	172	510	64	59	120	392	230	295	98	64	26	26
26	126	760	65	57	104	295	260	295	155	63	25	25
27	......	370	68	59	93	230	260	595	167	60	25	25
28	......	323	153	57	92	260	245	798	144	54	25	25
29	......	277	169	54	......	392	245	760	104	49	25	26
30	......	230	184	52	......	392	200	295	98	47	25	25
31	......	......	200	62	......	295	......	295	......	47	24	......

NOTE.—Discharge ascertained from rating curve well defined below 2,000 second-feet. Flat estimates computed from hydrographic comparison with record of South Fork of Skykomish River near Index, Oct. 8-11, 19-20, and 27-31, Nov. 1-2, 4-9, 15-18, Apr. 3-4, July 11-12, used in computing monthly discharge; discharge interpolated Oct. 4-6, 15, 17, 23-25, Nov. 12, 22, and 28-29, Dec. 3-7, 10-13, 18-20, and 29-30, Apr. 11 and 23, June 6, July 7-9, 18, and 25.

Monthly discharge of Miller Creek, near Berlin, Wash., for the year ending Sept. 30, 1915.

[Drainage area, 44.2 square miles.]

Month.	Discharge in second-feet.				Run-off.		Accuracy.
	Maximum.	Minimum.	Mean.	Per square mile.	Depth in inches on drainage area.	Total in acre-feet.	
October	....	....	333	7.53	8.68	20,500	B.
November	1,590	....	581	13.1	14.62	34,600	B.
December	200	64	99.1	2.24	2.58	6,090	B.
January	186	52	83.1	1.88	2.17	5,110	A.
February	141	76	96.0	2.17	2.26	5,330	A.
March	1,000	90	296	6.70	7.72	18,200	A.
April	....	200	449	10.2	11.38	26,700	A.
May	798	153	312	7.06	8.14	19,200	A.
June	278	98	158	3.57	3.98	9,400	A.
July	200	47	89.0	2.01	2.32	5,470	B.
August	43	24	32.6	.738	.85	2,000	B.
September	80	25	34.3	.776	.87	2,040	B.
The year	1,590	24	214	4.84	65.57	155,000	

NORTH FORK OF SKYKOMISH RIVER AT INDEX, WASH.

LOCATION.—In the SE. ¼ sec. 17, T. 27 N., R. 10 E., at Index, in Snohomish County, 1¾ miles above mouth of river.

DRAINAGE AREA.—143 square miles (measured on topographic and county maps).

RECORDS AVAILABLE.—August 24, 1910, to September 30, 1915.

GAGE.—Vertical staff since November 27, 1911, on wing dam on right bank directly back of observer's house about one-third mile above highway bridge; read once each day to quarter-tenths by Lee Pickett. Original gage a vertical staff on left bank about 100 feet above the tramway bridge; used August 24 to September 2, 1910, and destroyed in the course of improvements to channel. Vertical staff on right bank about one-fourth mile above highway bridge at lower end of wing dam and about 300 feet below present gage, used October 26, 1910, to November 26, 1911.

DISCHARGE MEASUREMENTS.—Made from a cable 600 feet below the gage or by wading.

CHANNEL AND CONTROL.—Bed of stream composed of gravel and large boulders; right bank high, protected by pile and timber wing dam, not subject to overflow; left bank slopes back gradually; zero flow would occur at gage height −1.2 feet ±0.3 foot, as determined August 22, 1915.

EXTREMES OF DISCHARGE.—Maximum stage recorded during year, 8.5 feet at 9 p. m. November 2 (discharge, 9,100 second-feet); minimum stage recorded, 0.45 foot at 1 p. m. September 29 (discharge, 97 second-feet).

1911–1915: Maximum stage recorded, 9.3 feet at 11 a. m. January 6, 1914 (discharge, 10,500 second-feet); minimum stage recorded September 29, 1915.

WINTER FLOW.—Stage-discharge relation not affected by ice.

DIVERSIONS.—None.

REGULATIONS.—None.

ACCURACY.—Rating curve well defined between 100 and 8,000 second-feet; control practically permanent; slight diurnal fluctuation during summer months; gage-height record reliable. Results excellent.

Discharge measurements of North Fork of Skykomish River at Index, Wash., during the year ending Sept. 30, 1915.

Date.	Made by—	Gage height.	Discharge.	Date.	Made by—	Gage height.	Discharge.
		Feet.	*Sec.-ft.*			*Feet.*	*Sec.-ft.*
Oct. 23	I. L. Collier	2.56	903	May 12	C. G. Paulsen	2.40	862
Feb. 11	J. T. Hartson	1.48	403	Aug. 22	do	.77	164

Daily discharge, in second-feet, of North Fork of Skykomish River at Index, Wash., for the years ending Sept. 30, 1912–1915.

Day.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.
1911-12.												
1	270	144	1,130	365	1,200	404	775	1,000	1,420	1,270	531	1,200
2	270	144	940	365	1,000	365	830	885	1,580	1,130	445	885
3	270	224	885	365	885	365	885	885	1,740	1,740	404	725
4	224	270	830	346	830	328	885	885	3,510	1,580	346	1,060
5	224	550	830	328	775	328	775	940	3,120	1,580	293	466
6	224	550	775	310	725	310	725	940	3,250	1,270	276	404
7	224	3,260	885	293	775	310	775	2,010	3,780	1,270	260	445
8	182	1,840	1,000	310	775	293	775	2,310	3,250	1,340	260	487
9	182	1,300	1,740	328	1,130	293	885	2,110	2,420	1,270	531	424
10	182	830	1,420	404	1,740	276	1,270	1,740	2,310	1,270	466	445
11	182	755	1,580	384	1,200	276	1,130	2,110	2,310	1,500	365	365
12	182	615	1,130	404	675	276	940	2,310	2,530	1,580	365	384
13	182	1,060	1,000	1,130	1,130	276	885	3,250	2,010	1,270	328	365
14	830	2,040	885	3,000	1,420	260	830	3,510	1,920	1,000	346	346
15	685	2,680	1,000	2,110	1,580	293	775	3,780	1,920	1,000	328	328
16	550	1,140	1,130	1,500	2,110	293	775	2,310	1,580	940	487	293
17	375	5,420	775	1,200	1,920	293	725	2,210	1,740	940	830	276
18	320	8,880	675	1,000	1,660	293	725	2,110	2,640	885	577	260
19	270	9,440	725	775	1,420	276	675	3,000	3,780	885	487	260
20	270	9,720	625	885	1,060	276	675	3,780	2,760	775	404	212
21	224	5,290	675	885	885	260	625	3,120	2,420	725	384	228
22	270	2,350	675	885	780	293	577	1,920	1,830	675	365	197
23	270	1,220	1,420	940	675	328	675	2,110	2,010	625	365	197
24	270	685	1,060	1,740	675	328	675	2,110	2,310	625	365	197
25	270	3,260	775	2,310	675	365	675	1,740	2,420	625	310	197
26	270	2,240	625	1,500	675	509	675	1,740	2,010	601	260	197
27	224	1,340	577	885	531	725	675	1,920	1,740	554	260	197
28	182	1,340	531	1,580	466	775	830	1,920	1,500	487	228	188
29	182	1,130	487	2,010	445	675	1,270	1,920	1,200	466	212	169
30	144	1,130	445	1,830	....	675	1,200	1,660	1,060	445	197	156
31	144	....	404	1,420	....	625	....	1,580	....	487	885	....

Day.	Oct.	Nov.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.
1912-13.									
1	260	404	....	546	963	3,830	2,440	1,090	293
2	554	404	....	594	848	5,060	2,220	1,240	276
3	487	404	....	546	848	5,380	1,920	1,090	692
4	487	....	....	570	742	3,970	1,820	963	5,060
5	384	....	....	594	692	3,280	2,780	904	2,220
6	276	....	....	642	1,240	3,280	2,660	848	1,310
7	328	....	....	642	1,920	3,690	3,020	848	1,090
8	675	....	....	642	2,660	3,550	2,440	794	794
9	487	....	....	642	3,020	3,020	2,660	742	848
10	404	....	....	692	2,550	2,780	3,280	692	963
11	404	....	....	1,240	2,330	2,780	2,120	692	742
12	328	....	....	1,920	2,660	2,780	1,920	642	742
13	260	....	....	1,730	2,120	3,020	1,920	570	642
14	244	....	....	1,920	2,020	2,330	1,920	546	618
15	310	....	....	1,550	1,730	2,330	1,550	642	500
16	1,130	....	....	1,390	1,640	2,550	1,550	642	477
17	725	....	....	1,240	1,640	2,440	1,550	642	454
18	675	....	....	1,640	1,640	2,550	1,730	594	454
19	675	....	....	2,020	1,730	2,900	2,780	594	410
20	675	....	642	1,920	1,730	2,780	2,330	546	389
21	675	....	594	2,330	2,330	2,780	2,780	523	410
22	625	....	546	2,120	2,780	2,780	2,780	500	389
23	577	....	454	1,920	3,020	3,550	2,120	500	410
24	830	....	432	1,730	3,550	2,330	2,120	477	454
25	885	....	410	1,090	2,780	2,330	1,920	410	432
26	830	....	368	1,550	3,020	2,220	1,730	410	432
27	725	....	368	1,920	2,780	2,330	1,550	389	410
28	487	....	368	1,240	2,330	2,440	1,240	368	368
29	509	....	618	963	2,330	2,120	1,390	368	368
30	466	....	591	904	2,900	2,440	1,240	368	329
31	404	....	570	....	3,280	....	1,020	368	....

Daily discharge, in second-feet, of North Fork of Skykomish River at Index, Wash., for the years ending Sept. 30, 1911–1915—Continued.

Day.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.
1913–14.												
1	329	546	1,020	329	546	1,550	546	904	2,330	1,730	368	172
2	311	477	963	293	546	1,390	570	2,330	2,550	1,550	368	172
3	311	454	794	293	500	1,090	642	2,780	2,020	1,550	368	172
4	329	477	794	3,830	454	963	1,240	2,120	1,730	1,470	329	160
5	311	742	742	5,060	410	794	1,920	1,640	1,390	1,090	329	148
6	276	963	692	9,820	368	848	1,730	1,640	1,090	963	329	148
7	500	963	642	4,900	368	904	1,550	1,730	963	963	329	144
8	546	1,090	642	3,020	348	904	1,550	1,730	1,730	963	329	198
9	742	1,090	594	1,920	311	848	1,640	1,730	1,390	904	311	293
10	742	1,310	546	1,550	329	794	1,730	1,730	1,240	963	311	212
11	8,200	904	594	1,310	311	794	1,640	1,820	1,390	963	293	227
12	5,380	642	594	1,020	329	963	1,470	1,920	1,550	963	293	227
13	3,020	618	594	904	329	1,090	1,820	2,550	1,550	963	293	227
14	2,120	618	642	848	368	2,550	2,660	3,020	2,220	848	293	904
15	1,730	594	594	848	348	1,820	3,690	3,020	2,660	794	293	1,730
16	1,240	5,720	546	848	348	2,120	2,780	2,660	2,440	742	276	963
17	1,090	2,660	500	794	368	1,920	1,640	2,220	2,120	742	259	794
18	963	1,550	523	692	348	1,920	1,550	1,920	1,730	742	243	1,390
19	963	1,390	432	642	410	1,820	3,020	1,920	1,550	742	227	2,020
20	1,020	1,160	410	594	642	1,730	2,660	2,440	1,470	642	243	1,730
21	1,090	1,090	410	546	848	2,020	1,820	2,330	1,470	500	243	1,160
22	963	963	389	594	848	2,120	1,550	2,900	1,550	454	227	1,090
23	963	1,730	368	523	848	2,330	1,470	2,550	1,390	454	227	848
24	904	3,830	410	477	848	2,440	1,240	2,120	1,240	454	212	794
25	904	2,120	368	477	2,780	1,240	1,160	2,020	1,240	454	212	742
26	742	1,920	348	546	1,550	963	1,240	1,920	1,240	432	212	742
27	692	1,640	368	500	1,390	848	1,310	1,820	1,390	368	198	742
28	546	1,470	329	477	1,550	692	1,090	1,550	1,390	348	198	642
29	642	1,240	311	454	....	642	1,020	1,390	1,390	368	198	1,090
30	500	1,240	311	546	....	618	1,090	1,390	1,820	368	212	477
31	523	....	311	546	....	594	....	1,730	....	368	198	....
1914–15.												
1	432	2,020	848	570	368	329	3,150	642	848	389	198	137
2	904	6,060	794	500	348	311	6,400	642	794	368	198	130
3	692	5,380	742	477	368	293	4,120	742	794	368	198	130
4	570	5,720	742	410	348	348	2,440	742	848	368	185	130
5	546	2,780	642	410	389	389	2,120	742	794	368	172	126
6	454	2,330	570	368	432	368	1,730	904	794	329	172	116
7	432	2,020	500	368	500	368	1,820	963	692	329	172	106
8	410	1,550	500	368	500	368	1,550	963	594	329	172	227
9	368	1,730	454	368	454	368	1,240	963	570	311	172	198
10	546	2,330	410	368	454	432	1,240	963	500	243	172	172
11	848	2,780	368	454	454	410	1,240	963	477	243	172	160
12	1,240	1,820	348	454	410	594	1,470	848	454	243	172	137
13	963	1,920	293	410	368	1,090	1,390	794	454	410	172	126
14	848	1,470	329	368	368	1,240	1,640	848	454	523	172	137
15	848	1,240	311	368	329	2,330	1,550	692	454	477	172	137
16	1,160	1,090	293	329	311	1,550	1,550	692	454	410	172	137
17	1,390	904	293	293	293	1,090	1,640	848	454	368	172	130
18	2,120	742	293	259	329	1,310	1,550	742	454	368	172	126
19	2,020	742	259	276	329	1,020	1,550	794	570	329	172	122
20	1,920	2,220	259	293	348	963	1,390	794	500	329	172	116
21	1,550	1,730	259	311	329	1,090	1,020	692	477	293	172	116
22	1,090	1,390	259	293	329	1,390	1,020	692	454	293	172	110
23	963	1,390	227	276	348	1,550	904	642	410	293	172	110
24	848	1,470	227	259	348	1,550	848	692	410	259	160	126
25	848	1,310	227	259	368	1,020	848	794	368	259	148	116
26	742	1,640	311	243	329	848	848	794	389	259	148	110
27	692	1,550	293	227	329	794	848	1,310	477	259	144	106
28	642	1,390	293	227	329	848	848	2,020	454	227	137	102
29	594	1,240	293	227	....	963	848	1,310	410	227	137	97
30	848	963	293	227	....	963	848	963	410	227	148	1,090
31	1,240	....	....	329	....	904	....	848	....	227	137	....

Monthly discharge of North Fork of Skykomish River at Index, Wash., for the years ending Sept. 30, 1912–1915.

[Drainage area, 143 square miles.]

Month.	Discharge in second-feet.				Run-off.		Accuracy.
	Maximum.	Minimum.	Mean.	Per square mile.	Depth in inches on drainage area.	Total in acre-feet.	
1911–12.							
October	830	144	276	1.93	2.22	17,000	A.
November	9,720	144	2,360	16.5	18.41	140,000	A.
December	1,740	404	891	6.23	7.18	54,800	B.
January	3,000	293	1,030	7.20	8.30	63,300	B.
February	2,110	445	1,030	7.20	7.76	59,200	B.
March	775	260	376	2.63	3.03	23,100	B.
April	1,270	577	820	5.73	6.39	48,800	B.
May	3,780	885	2,060	14.4	16.60	127,000	B.
June	3,780	1,060	2,270	15.9	17.74	135,000	B.
July	1,740	445	994	6.95	8.01	61,100	B.
August	885	197	392	2.74	3.16	24,100	B.
September	1,200	156	385	2.69	3.00	22,900	B.
The year	9,720	144	1,070	7.48	101.80	776,000	
1912–13.							
October	1,130	244	541	3.78	4.36	33,300	B.
Nov. 1–3	404	404	404	2.83	.32	2,400	B.
Mar. 20–31	642	368	497	3.48	1.55	11,800	A.
April	2,330	546	1,280	8.95	9.99	76,200	A.
May	3,550	692	2,120	14.8	17.06	130,000	A.
June	5,380	2,120	2,990	20.9	23.32	178,000	A.
July	3,280	1,020	2,080	14.5	16.72	128,000	A.
August	1,240	368	645	4.51	5.20	39,700	A.
September	5,060	276	766	5.36	5.98	45,600	A.
1913–14.							
October	8,200	276	1,240	8.67	10.00	76,200	A.
November	5,720	454	1,370	9.58	10.69	81,500	A.
December	1,020	311	541	3.78	4.36	33,300	A.
January	9,820	293	1,460	10.2	11.76	89,800	A.
February	2,780	311	666	4.66	4.85	37,000	A.
March	2,550	594	1,330	9.30	10.72	81,800	A.
April	3,690	546	1,630	11.4	12.72	97,000	A.
May	3,020	904	2,050	14.3	16.49	126,000	A.
June	2,660	963	1,640	11.5	12.83	97,600	A.
July	1,730	348	802	5.61	6.47	49,300	A.
August	368	198	272	1.90	2.19	16,700	A.
September	2,020	144	679	4.75	5.30	40,400	A.
The year	9,820	144	1,140	7.97	108.38	827,000	
1914–15.							
October	2,120	368	928	6.49	7.48	57,100	A.
November	6,060	742	2,030	14.2	15.84	121,000	A.
December	848	227	394	2.76	3.18	24,200	A.
January	570	227	342	2.39	2.76	21,000	A.
February	500	293	372	2.60	2.71	20,700	A.
March	2,330	293	874	6.11	7.04	53,700	A.
April	6,400	848	1,660	11.6	12.94	98,800	A.
May	2,020	642	872	6.10	7.03	53,600	A.
June	848	368	540	3.78	4.22	32,100	A.
July	523	227	320	2.24	2.58	19,700	A.
August	198	137	168	1.17	1.35	10,300	A.
September	1,090	97	163	1.14	1.27	9,700	A.
The year	6,400	97	720	5.03	68.40	522,000	

MIDDLE FORK OF SNOQUALMIE RIVER NEAR NORTH BEND, WASH.

Location.—In the NE. ¼ SE. ¼ sec. 10, T. 23 N., R. 8 E., a mile southeast of North Bend, in King County, and 2¾ miles above junction with the North Fork.

Drainage area.—184 square miles (measured on topographic map).

Records available.—August 10, 1907, to February 29, 1908; August 25, 1908, to September 30, 1915.

Gage.—Stevens water-stage recorder installed August 7, 1915, referred to inclined staff on left bank 1 mile southeast of North Bend. Prior to August 7, 1915, at highway bridge 2¼ miles below present site as follows: August 10, 1907, to February 29, 1908, two vertical staffs at same datum; location and datum in respect to subsequent gages unknown; August 25, 1909, to November 30, 1909, when gage washed out, vertical staff on right bank 300 feet above bridge; December 21, 1909, to November 21, 1910, when gage washed out, vertical staff on piling of wing wall on left bank about 100 feet below bridge at same datum as previous gage; December 5, 1910, to March 14, 1911, two temporary vertical staffs at datum 0.60 foot higher than previous gage. March 15, 1911, to September 1, 1912, vertical staff on left side about 200 feet above bridge at datum 1 foot lower than previous temporary gages and 0.40 foot lower than gages in use August 25, 1908, to November 21, 1910. All readings August 25, 1908, to March 14, 1911, corrected to datum of this gage; September 2, 1912, to August 6, 1915, Fuller water-stage recorder installed on left bridge support, referred to vertical staff, 0.50 foot higher in datum than previous gage. Readings to tenths every second day August 10, 1907, to February 29, 1908, and daily August 25, 1908, to September 1, 1912, by M. H. Norman. Water-stage recorders inspected once or twice a week by employees Puget Sound Traction Light & Power Co.

Discharge measurements.—Made by wading or from highway bridge at original location of gage.

Channel and control.—Channel at new location composed of large boulders; slightly curved above and below station. Control not likely to shift. Left bank high; right bank low, heavily wooded. Channel at original location composed of silt and fine gravel; shifting at high stages. Banks high; one channel at all stages. Stage of zero flow, gage height −0.05 foot, as measured September 10, 1911; at −1.2 feet, August 20, 1914; and at −0.9 foot, July 27, 1915.

Extremes of discharge.—Maximum stage during year, from water-stage recorder, 6.2 feet November 2 (discharge, 8,100 second-feet); minimum stage from recorder, 1.50 feet at 1 p. m. September 30 (discharge, 146 second-feet).

1907–1915: Maximum stage recorded, 13.4 feet, estimated by observer when water was above gage, November 23 and 29, 1909 (discharge not determined); stage may have been higher November 18, 1911, when water was above gage (discharge estimated by hydrographic comparison with the North and South forks at 18,000 second-feet); minimum stage recorded, September 30, 1915.

Winter flow.—Stage-discharge relation not affected by ice.

Diversions.—None.

Regulation.—None.

Accuracy.—Gage-height record prior to installation of water-stage recorder not very reliable. Results for that period are only fair. Results for 1913 are only fair on account of poorly defined rating curve (used to Feb. 16, 1913) and breaks in record. Results after May 31, 1915, excellent. Results for remainder of period good.

Cooperation.—Gage-height record and most of discharge measurements furnished by the Puget Sound Traction, Light & Power Co.

Discharge measurements of Middle Fork of Snoqualmie River near North Bend, Wash., during 1907–1915.

Date.	Made by—	Gage height.	Discharge.
1907.		*Feet.*	*Sec.-ft.*
Aug. 10	A. S. Kalenborn	0.75	312
Oct. 29	do	.42	218
31	do	.86	338
1908.			
Sept. 11	M. T. Crawford	1.80	248
Nov. 11	do	1.98	377
1909.			
Aug. 27	A. T. Harris	2.50	535
1910.			
Mar. 18	do	5.20	3,100
June 30	Crawford and Easter	2.60	698
Sept. 21	R. R. Easter	1.00	188
1911.			
Mar. 17	do	2.85	740
Sept. 10	Parker and Crawford	2.46	606
Oct. 11	R. R. Easter	2.10	359
1912.			
Feb. 20	Weller Rose	3.32	1,220
Mar. 29	do	2.90	885
Apr. 24	do	2.65	708
1912.		*Feet.*	*Sec.-ft.*
May 9	R. C. Pierce	4.15	2,400
July 30	Weller Rose	2.20	372
1913.			
Jan. 27	Rose and Evertson	2.69	1,280
June 7	Eernisse and Wenzell	3.88	3,160
7	do	4.08	3,520
July 23	G. L. Parker	2.90	1,560
23	Tuttle and Rose	2.90	1,600
Sept. 19	Rose and Hodges	1.62	451
1914.			
Jan. 6	Rose and Beery	6.12	7,900
May 11	Weller Rose	2.75	1,620
Aug. 20	Collier and Rose	.56	218
1915.			
Jan. 13	McFadden and Brown	1.55	734
Mar. 18	Hartson and McFadden	2.20	1,270
Apr. 8	McFadden and Wilbur	4.76	4,760
July 14	McFadden and Wicklund	1.22	637
27	J. T. Hartson	2.10	334
Aug. 6	Hartson and McFadden	1.93	272
Sept. 4	McFadden and Norman	1.59	163

Daily discharge, in second-feet, of Middle Fork of Snoqualmie River near North Bend, Wash., for the years ending Sept. 30, 1907–1915.

Day.	Aug.	Sept.
1907.		
1		266
2		276
3		286
4		276
5		266
6		371
7		476
8		476
9		476
10	308	490
11	297	504
12	286	504
13	286	504
14	286	
15	276	
16	266	
17	266	1,130
18	266	
19	266	
20	266	
21	256	424
22	246	377
23	266	330
24	286	330
25	381	330
26	476	330
27	463	330
28	450	319
29	491	308
30	532	308
31	399	

Daily discharge, in second-feet, of Middle Fork of Snoqualmie River near North Bend, Wash., for the years ending Sept. 30, 1907-1915—Continued.

Day.	Oct.	Nov.	Dec.	Jan.	Feb.	Aug.	Sept.
1907-8.							
1	308	417	....	691	412	....	338
2	319	504	....	504	400	....	276
3	330	504	....	504	400	....	276
4	319	504	....	504	400	....	276
5	308	440	562	504	481	....	248
6	308	376	562	504	562	....	248
7	308	376	562	599	506	....	248
8	297	376	547	694	450	....	446
9	286	364	532	694	450	....	372
10	286	352	613	694	450	....	306
11	286	352	694	714	450	....	276
12	266	352	694	734	450	....	248
13	246	364	694	679	437	....	248
14	256	376	736	624	424	....	222
15	266	400	778	608	464	....	222
16	266	424	701	592	504	....	222
17	266	437	624	643	619	....	222
18	266	450	564	694	734	....	198
19	266	463	504	714	648	....	198
20	266	476	548	734	562	....	176
21	266	519	592	679	533	....	176
22	266	562	861	624	504	....	176
23	266	547	1,130	593	504	....	176
24	266	532	1,480	562	504	....	176
25	266	547	1,840	533	490	306	176
26	256	562	1,480	504	476	276	176
27	246	....	1,130	477	567	248	154
28	236	....	954	450	658	248	154
29	226	....	778	450	658	408	154
30	266	....	828	450	....	584	154
31	330	....	878	424	....	488	....

Day.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.
1908-9.												
1	222	1,950	446	1,480	488	696	1,140	1,390	5,460	1,390	488	248
2	372	1,480	198	1,660	534	638	828	1,480	4,940	1,300	488	222
3	372	1,220	222	4,030	760	638	696	2,050	3,410	1,220	446	222
4	372	1,220	176	2,370	488	638	638	2,260	2,590	1,220	446	222
5	372	696	222	1,480	488	696	638	1,480	2,370	1,140	408	222
6	372	488	338	1,480	488	638	638	1,300	2,050	1,300	408	222
7	338	488	446	1,570	488	534	638	1,140	1,950	1,950	372	198
8	372	446	534	1,060	534	534	760	1,140	1,950	1,480	372	198
9	408	446	534	696	488	696	828	1,140	1,950	1,390	338	198
10	446	372	638	446	446	638	828	1,220	2,810	1,390	446	222
11	446	338	638	446	446	534	760	1,390	3,170	1,950	338	248
12	446	306	696	446	408	534	760	1,060	1,850	1,300	306	198
13	696	276	1,570	446	372	534	1,060	1,060	1,750	975	306	176
14	900	248	1,140	446	372	534	1,060	1,060	1,660	696	276	176
15	900	248	1,140	446	760	534	1,060	1,060	1,660	638	276	176
16	900	306	1,060	638	1,300	534	900	1,060	1,570	584	248	176
17	696	828	975	828	3,050	584	696	1,220	1,480	584	248	222
18	534	5,590	900	2,700	2,260	638	696	1,220	1,480	584	222	222
19	584	1,950	696	2,590	1,570	534	638	1,300	1,570	534	222	222
20	638	1,480	534	4,550	1,140	534	638	1,140	1,480	534	198	638
21	534	1,660	534	3,410	900	534	584	1,140	1,480	534	176	900
22	446	2,050	488	1,660	760	534	584	900	1,390	534	176	828
23	408	1,570	638	1,390	760	638	696	900	1,480	534	176	584
24	408	2,260	638	1,140	828	696	828	1,220	1,390	534	176	446
25	446	1,060	2,370	900	900	696	2,370	1,390	1,390	534	176	408
26	446	760	1,480	760	900	760	2,930	1,950	1,480	488	372	338
27	446	638	2,480	696	975	760	1,660	3,170	1,480	488	372	306
28	446	534	1,850	760	760	760	1,660	2,050	1,390	488	222	584
29	975	534	1,850	638	....	760	1,390	2,050	1,300	488	198	584
30	3,170	488	1,750	638	....	760	1,300	2,700	1,300	488	176	584
31	3,170	....	1,750	534	....	828	....	3,050	....	488	176	....

Daily discharge, in second-feet, of Middle Fork of Snoqualmie River near North Bend, Wash., for the years ending Sept. 30, 1907–1915—Continued.

Day.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.
1909–10.												
1	584	......	......	602	2,110	5,490	1,080	1,080	1,810	648	372	222
2	584	......	......	516	1,330	5,230	1,000	1,080	1,240	602	314	222
3	975	......	......	516	1,000	4,580	1,000	1,080	1,240	602	288	222
4	900	......	......	516	804	3,340	1,080	1,240	1,000	648	288	188
5	760	......	......	516	748	2,540	1,160	1,330	1,000	602	288	188
6	696	......	......	476	748	1,910	1,420	1,420	1,160	602	288	222
7	900	......	......	476	648	1,520	1,520	2,010	1,160	602	288	222
8	828	......	......	476	602	1,330	1,520	2,010	1,080	602	288	222
9	584	......	......	476	558	1,160	1,810	2,010	1,080	602	288	222
10	534	......	......	476	558	1,080	1,610	4,840	1,080	748	288	222
11	534	......	......	438	516	1,520	1,520	4,320	3,220	748	288	222
12	488	......	......	438	516	2,110	1,520	3,100	1,610	748	264	188
13	446	......	......	404	602	2,320	1,420	2,210	1,160	748	264	174
14	408	......	......	372	602	2,760	1,330	1,910	1,160	696	242	174
15	372	......	......	372	558	2,870	1,240	1,520	1,160	696	242	188
16	372	......	......	342	516	2,540	1,080	1,240	1,080	648	242	188
17	338	......	......	342	516	3,220	1,080	1,710	1,080	602	242	222
18	338	......	......	1,000	476	3,100	1,240	1,710	930	558	242	222
19	338	......	......	804	476	3,580	2,430	1,610	696	476	242	222
20	338	......	......	648	476	3,100	3,100	1,160	1,080	476	242	188
21	408	......	930	602	476	2,650	2,110	1,330	930	476	222	188
22	584	......	602	4,320	438	2,430	1,910	1,610	804	476	222	188
23	488	......	602	4,320	438	2,320	2,010	2,010	696	438	222	188
24	900	......	602	4,450	1,000	1,910	3,220	2,210	696	404	222	188
25	488	......	602	3,340	1,420	1,420	3,340	3,100	696	404	222	188
26	446	......	602	1,610	1,160	1,240	3,100	1,810	748	404	222	188
27	446	......	558	1,420	1,520	1,080	2,110	1,610	696	404	222	188
28	408	......	516	1,610	2,760	1,080	1,810	1,240	648	404	222	188
29	408	......	602	1,160	......	1,000	1,520	1,420	648	372	222	204
30	584	......	602	2,210	......	1,000	1,080	1,610	648	372	222	558
31	638	......	864	2,110	......	1,240	......	1,610	......	372	222	......
1910–11.												
1	2,430	930	......	......	......	......	760	975	2,370	1,080	476	372
2	2,010	864	......	......	......	......	828	1,300	1,300	1,080	438	372
3	7,960	1,160	......	......	......	......	760	1,570	1,300	1,000	438	438
4	4,580	864	......	......	......	......	638	2,260	1,220	1,240	438	476
5	4,320	648	......	......	......	......	584	2,260	975	1,160	438	602
6	2,110	2,210	......	......	......	......	534	1,480	975	1,330	404	648
7	4,710	5,620	......	......	......	......	488	1,390	1,060	1,160	404	602
8	2,210	2,210	......	......	......	......	584	1,480	975	1,000	404	558
9	1,810	1,330	......	......	......	......	534	1,140	1,220	930	404	558
10	1,240	8,350	......	......	......	......	760	1,060	1,480	864	404	648
11	1,080	3,220	......	......	......	......	638	1,060	2,700	804	404	516
12	930	2,430	......	......	......	......	584	975	2,980	748	404	558
13	696	2,010	......	......	......	......	534	1,140	2,870	748	404	2,320
14	602	1,710	......	......	......	......	534	1,060	1,710	804	404	2,150
15	1,080	1,330	......	......	......	......	534	1,060	1,710	804	372	2,050
16	864	1,160	......	......	......	638	584	975	1,610	804	372	1,570
17	2,870	930	......	......	......	760	534	1,480	1,240	804	372	975
18	2,430	804	......	......	......	760	638	2,150	1,000	748	372	696
19	1,610	864	......	......	......	900	638	1,950	930	748	372	584
20	558	2,110	......	......	......	900	638	1,570	1,000	748	476	584
21	804	......	......	......	......	900	696	1,390	930	696	476	534
22	696	......	......	......	......	975	760	1,220	1,080	602	438	488
23	696	......	......	......	......	1,060	760	1,140	864	602	404	488
24	804	......	......	......	......	1,140	1,140	1,140	864	602	372	488
25	2,870	......	......	......	......	900	1,140	1,140	864	602	372	446
26	1,610	......	......	......	......	828	1,060	1,140	864	558	372	446
27	1,080	......	......	......	......	696	1,060	1,140	1,240	558	372	408
28	804	......	......	......	......	696	900	1,220	1,160	516	372	408
29	602	......	......	......	......	638	828	1,480	930	476	372	408
30	558	......	......	......	......	975	900	1,750	930	476	372	408
31	516	......	......	......	......	760	......	2,260	......	476	372	......

Daily discharge, in second-feet, of Middle Fork of Snoqualmie River, near North Bend, Wash., for the years ending Sept. 30, 1907–1915—Continued.

Day.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.
1911–12.												
1	372	276	1,600	635	1,600	565	875	1,060	1,480	1,850	370	3,270
2	338	276	1,480	635	1,260	430	965	965	1,370	790	370	1,500
3	338	276	1,260	635	1,160	430	875	875	1,370	790	310	1,730
4	338	276	1,260	635	1,060	370	1,060	875	1,370	790	310	901
5	306	338	1,160	635	965	370	1,160	790	1,720	965	255	735
6	306	900	1,160	565	875	370	790	875	1,370	965	255	632
7	306	5,070	1,260	635	1,160	370	790	1,260	2,590	1,600	255	928
8	306	1,850	1,990	565	1,370	310	875	2,430	2,280	875	255	1,730
9	276	1,060	2,280	635	1,600	310	875	2,280	1,480	710	255	1,170
10	372	760	2,280	965	2,280	255	1,370	1,990	1,480	710	255	874
11	372	696	1,990	875	1,850	255	1,060	1,990	1,370	975	430	727
12	372	696	2,130	1,060	1,600	255	965	1,990	1,480	875	310	632
13	372	900	1,720	2,590	1,260	200	1,160	3,450	1,480	790	310	566
14	1,140	2,480	1,260	8,130	1,600	200	875	3,450	2,430	790	310	524
15	696	1,390	1,260	2,920	1,260	200	790	3,450	1,370	790	255	458
16	446	1,140	1,600	2,750	3,090	255	790	1,990	1,370	710	370	421
17	372	5,980	1,370	1,600	2,430	370	710	1,600	1,370	710	1,060	397
18	372	......	1,260	1,480	2,130	495	710	1,600	1,600	710	635	385
19	372	......	1,160	1,260	1,600	430	710	1,600	1,990	710	495	368
20	338	8,880	1,160	1,260	1,320	430	710	4,440	2,130	565	430	358
21	338	6,670	1,060	2,590	1,060	430	635	3,830	2,280	565	370	341
22	306	2,750	1,060	1,370	965	430	635	2,430	1,480	565	370	330
23	306	1,990	1,990	1,260	1,160	430	635	1,990	1,370	635	310	324
24	306	1,720	1,370	1,540	965	430	710	1,370	1,160	635	310	319
25	306	1,600	1,370	3,450	875	430	710	1,720	1,600	635	310	314
26	306	4,030	1,160	2,130	875	565	635	2,280	1,480	565	310	308
27	306	2,430	1,060	1,720	875	635	635	2,430	1,370	430	310	297
28	306	1,850	965	2,750	710	710	710	1,990	1,370	370	255	292
29	306	1,720	965	3,640	635	875	875	1,600	1,160	370	255	308
30	276	1,600	790	4,030	......	790	1,370	1,260	1,850	370	255	341
31	276	......	710	2,130	......	710	......	965	......	370	495	......
1912–13.												
1	391	595	778	......	719	730	1,060	......	4,300	2,480	838	300
2	452	580	892	......	663	737	935	......	4,500	1,880	820	......
3	552	580	2,390	......	648	808	912	......	4,500	1,580	804	......
4	663	655	1,980	......	625	868	966	......	......	1,580	795	3,360
5	538	1,210	1,340	1,290	545	1,010	1,160	......	......	1,940	......	2,150
6	445	1,340	1,070	1,290	510	1,030	1,120	......	2,620	2,140	......	1,120
7	403	1,390	892	1,220	458	1,050	1,070	......	2,860	1,880	......	838
8	1,080	1,790	874	986	421	1,160	998	......	......	1,940	......	605
9	865	2,250	760	752	445	1,100	1,010	......	......	2,340	......	880
10	640	1,920	711	679	497	1,120	1,200	......	......	1,880	549	715
11	531	1,980	744	610	545	1,070	1,890	......	2,140	1,700	......	......
12	471	2,250	719	602	580	1,010	2,010	......	......	1,640	......	......
13	433	3,420	744	580	655	935	1,890	......	......	1,640	......	487
14	415	2,250	847	538	919	905	......	......	......	1,700	......	435
15	397	1,500	735	510	2,540	875	......	......	1,880	1,360	......	387
16	439	1,190	847	458	3,500	1,030	......	......	1,880	1,310	......	381
17	928	3,330	1,160	445	3,920	1,290	......	......	1,820	1,420	442	375
18	919	3,590	1,250	421	2,140	1,520	......	......	2,000	1,580	577	423
19	982	2,320	1,000	391	1,570	1,290	......	......	2,700	1,700	485	448
20	......	1,730	874	385	1,290	1,090	2,010	......	2,780	1,820	393	411
21	......	1,440	812	380	1,160	974	......	......	2,560	1,820	405	468
22	......	1,390	760	368	1,120	845	......	......	2,480	1,820	......	1,020
23	......	1,440	946	358	1,030	822	......	......	2,560	1,700	......	715
24	......	1,290	1,000	735	905	786	1,420	......	2,560	1,520	423	549
25	......	1,190	883	640	875	730	1,470	......	2,410	1,360	411	448
26	......	1,050	812	1,670	822	730	1,840	......	2,270	1,090	405	411
27	820	910	847	1,190	800	765	1,670	......	2,200	1,050	387	364
28	752	820	928	1,040	772	815	......	2,550	2,070	1,060	353	353
29	735	760	1,290	982	......	1,380	......	......	1,700	934	358	353
30	735	744	......	892	......	1,470	......	......	2,410	779	370	320
31	671	......	......	803	......	1,120	......	3,370	......	804	335	......

Daily discharge, in second-feet, of Middle Fork of Snoqualmie River, near North Bend, Wash., for the years ending Sept. 30, 1907–1915—Continued.

Day.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.
1913–14.												
1	310	744	1,570	618	1,200	2,270	612	1,670	1,950	1,130	295	182
2	270	698	1,340	606	875	1,470	600	2,140	1,950	1,120	292	176
3	320	636	1,160	950	672	1,200	672	2,200	1,620	1,060	290	174
4	348	679	1,050	4,800	800	1,160	1,380	1,620	1,200	998	288	171
5	348	1,200	990	8,100	730	974	1,720	1,420	1,050	822	285	169
6	348	2,200	950	7,600	600	890	2,270	1,420	860	808	284	183
7	655	1,340	920	5,190	550	905	1,890	1,470	838	672	283	202
8	916	1,160	860	2,780	503	1,040	1,380	1,470	2,080	654	282	218
9	1,470	1,290	800	2,120	488	1,120	1,380	1,470	1,670	660	278	256
10	8,170	1,470	751	1,470	493	1,120	1,420	1,620	1,290	654	262	250
11	8,100	1,160	765	1,290	545	898	1,420	1,620	1,200	606	250	236
12	3,550	1,020	860	1,010	572	860	1,380	1,720	1,290	612	250	234
13	3,820	912	800	966	578	1,120	2,010	2,140	1,290	618	250	228
14	2,700	868	875	890	578	2,410	2,410	2,700	1,290	589	250	285
15	2,080	815	950	890	567	2,270	3,550	2,480	1,520	550	239	838
16	1,890	2,140	838	950	550	2,860	2,340	1,890	1,620	508	234	618
17	1,720	1,420	800	868	545	2,270	1,670	1,670	1,670	514	231	561
18	1,620	1,420	744	786	540	1,780	1,520	1,520	1,520	519	225	905
19	1,520	1,470	704	698	550	1,670	2,200	1,470	1,290	480	220	966
20	1,470	1,470	660	606	654	1,620	2,410	1,670	1,100	442	212	1,380
21	1,380	1,470	666	982	920	1,470	1,620	1,950	1,240	403	220	1,110
22	1,200	1,470	654	1,670	1,520	1,340	1,340	1,950	1,070	364	220	642
23	1,080	1,840	642	1,120	1,670	1,120	1,240	1,840	868	368	212	524
24	1,340	3,190	630	838	1,470	1,030	1,110	1,670	1,030	366	207	460
25	1,290	2,010	606	830	1,290	966	982	1,670	1,420	364	205	406
26	1,020	1,780	595	800	982	830	1,080	1,520	1,200	360	200	406
27	1,030	1,670	600	698	2,080	765	1,290	1,340	1,160	356	200	724
28	935	1,670	589	612	1,160	717	1,200	1,200	1,150	352	200	514
29	830	1,620	508	606	....	698	1,080	1,010	1,140	306	202	415
30	786	1,570	550	737	....	679	1,200	1,120	1,140	295	196	356
31	704	....	606	875	....	654	....	1,470	....	295	189	....

Daily discharge, in second-feet, of Middle Fork of Snoqualmie River near North Bend, Wash., for the years ending Sept. 30, 1907–1915—Continued.

Day.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.
1914–15.												
1	328	1,160	727	898	564	423	2,440	495	935	447	313	180
2	630	7,200	689	765	596	406	6,790	467	853	442	309	182
3	717	7,680	665	647	554	394	5,610	569	762	438	305	170
4	567	3,840	641	586	533	462	3,490	543	713	424	297	163
5	493	3,580	619	524	575	653	2,100	554	719	420	289	170
6	428	2,780	495	462	739	538	1,600	596	762	398	273	163
7	389	2,000	485	458	714	504	1,550	727	743	406	254	156
8	360	1,040	458	436	689	485	1,410	720	660	415	245	245
9	340	940	432	504	671	458	1,020	689	589	424	236	451
10	612	850	406	564	647	449	876	883	579	398	232	300
11	1,670	4,110	375	689	619	462	942	799	558	363	229	229
12	1,420	2,830	367	779	569	454	1,190	695	518	346	229	200
13	1,290	2,230	355	733	528	440	1,410	596	480	506	223	198
14	890	1,650	330	714	499	803	1,140	559	489	655	217	206
15	704	1,390	325	689	458	1,800	935	538	484	568	217	226
16	606	1,140	320	602	440	1,460	1,000	504	499	632	217	236
17	1,240	980	320	595	476	996	1,230	472	518	833	220	217
18	2,780	806	316	588	653	1,140	1,230	659	518	677	214	200
19	2,940	869	323	581	538	965	1,190	855	538	589	209	184
20	2,010	2,700	320	575	467	826	1,140	958	725	528	212	182
21	1,290	2,100	337	564	462	1,140	876	733	677	475	209	174
22	1,030	1,520	334	509	454	1,460	695	641	573	415	209	170
23	765	1,410	323	467	436	1,650	602	602	518	398	206	167
24	692	1,250	313	440	427	1,360	569	647	499	376	203	165
25	666	1,160	310	398	499	1,030	607	785	452	363	200	163
26	600	1,300	306	375	499	869	630	806	558	351	192	159
27	540	1,210	306	359	449	683	602	1,420	579	334	190	163
28	474	1,060	533	359	432	765	602	3,360	528	318	184	161
29	450	942	485	359	....	1,020	641	2,060	475	318	182	152
30	514	862	509	355	....	1,060	580	1,410	452	318	184	150
31	730	....	585	406	....	935	....	1,080	....	318	182	....

NOTE.—Discharge determined as follows: 1907–8—Aug. 10, 1907, to Feb. 29, 1908, from poorly defined rating curve; interpolated for days on which gage was not read; estimated from hydrographs of the North, Middle, and South forks for the following periods: Sept. 14–16, 795 second-feet; Sept. 18–20, 825 second-feet; Nov. 27, 1907, to Dec. 4, 1907, 3,250 second-feet. Gage heights Dec. 11, 1907, to Feb. 29, 1908, reduced to datum of original gage. Aug. 25 to Sept. 30, 1908, from rating curve fairly well defined below 1,000 second-feet.

1908–9—Aug. 25, 1908, to Sept. 30, 1908, from rating curve fairly well defined below 1,000 second-feet.

1909–10—Oct. 1–31, 1909, from rating curve fairly well defined below 1,000 second-feet. Discharge for November, 1909, not ascertained, as water was over gage Nov. 2, 3, 18, 19, 23, 24, 29, and 30, and extension of rating curve for high water is uncertain; Dec. 21, 1909, to Sept. 30, 1910, from rating curve fairly well defined below 3,500 second-feet. No record Dec. 1–20, 1909.

1910–11—Oct. 1 to Nov. 20, 1910, from rating curve fairly well defined below 3,500 second-feet; Nov. 21, 1910, to Mar. 15, 1911, discharge not ascertained as no discharge measurements are available to indicate the amount of scour caused by high water in November. The hydrographic comparison shows that there was considerable scour followed by filling early in March. Mar. 16 to June 11, 1911, and Sept. 14–30, 1911, from rating curve fairly well defined below 1,000 second-feet; June 12 to Sept. 13, 1911, from rating curve fairly well defined below 3,500 second-feet. Gage heights, Aug. 25, 1908, to Nov. 20, 1910, reduced to datum of gage installed Mar. 15, 1911.

1911–12—Oct. 1 to Nov. 17, 1911, from rating curve fairly well defined below 1,000 second-feet; Nov. 18–19, water over gage, discharge estimated from hydrographs at 18,000 second-feet and 13,500 second-feet, respectively; Nov. 20, 1911, to Sept. 1, 1912, from rating curve well defined below 3,000 second-feet; Sept. 2–30, 1912, from poorly defined rating curve. Gage height Sept. 2, 1912, reduced to datum of water-stage recorder installed Sept. 3.

1912–13—Oct. 1, 1912, to Feb. 16, 1913, from poorly defined rating curve; Feb. 17 to June 8, 1913, from rating curve fairly well defined throughout; June 9 to Sept. 30, 1913, from rating curve fairly well defined below 2,000 second-feet. Discharge estimated from hydrographs as follows: Oct. 20–26, 1912, 856 second-feet; Dec. 30–31, 1912, 1,640 second-feet; Jan. 1–4, 1913, 3,000 second-feet; Apr. 14–19, 1,340 second-feet; Apr. 21–23, 1,940 second-feet; Apr. 28–30, 1,230 second-feet; June 4–5, 3,390 second-feet; June 8–10, 2,870 second-feet; June 12–14, 2,320 second-feet; Aug. 5–9, 672 second-feet; Aug. 11–16, 496 second-feet; Aug. 19, interpolated; Aug. 22–23, 414 second-feet; Sept. 2–3, 335 second-feet; Sept. 11–12, 580 second-feet.

1913–14—Oct. 1–10, 1913, from rating curve fairly well defined below 2,000 second-feet; Oct. 11, 1913, to Sept. 30, 1914, from rating curve fairly well defined throughout. No record, discharge interpolated, for following days, all 1914: Jan. 7, 9, June 28–30, July 1, 3, 19–21, 24, Aug. 2–4, 6, 7, 30, 31, and Sept. 1, 3, 4.

1914–15—Oct. 1 to Nov. 2, 1914, from rating curve fairly well defined throughout; Nov. 3, 1914, to May 28, 1915, from rating curve fairly well defined below 5,000 second-feet; May 29 to Aug. 6, 1915, from rating curve well defined below 1,000 second-feet; Aug. 7 to Sept. 30, 1915 (at new site), from well defined rating curve. Stage-discharge relation affected by ice, discharge estimated, Dec. 15–16, 1914.

Monthly discharge of Middle Fork of Snoqualmie River near North Bend, Wash., for the years ending Sept. 30, 1907–1915.

[Drainage area, 184 square miles.]

Month.	Discharge in second-feet.				Run-off.		Accuracy.
	Maximum.	Minimum.	Mean.	Per square mile.	Depth in inches on drainage area.	Total in acre-feet.	
1907.							
August 10–31	532	246	332	1.80	1.47	14,500	D.
September	1,130	266	485	2.64	2.94	28,900	D.
1907–8.							
October	330	226	278	1.51	1.74	17,100	D.
November	....	352	819	4.45	4.96	48,700	D.
December	....	504	1,120	6.09	7.02	68,900	D.
January	734	424	593	3.22	3.71	36,500	D.
February	734	400	507	2.76	2.98	29,200	D.
August 25–31	584	248	365	1.98	.52	5,070	C.
September	446	154	231	1.26	1.41	13,700	C.
1908–9.							
October	3,170	222	686	3.73	4.30	42,200	C.
November	5,590	248	1,060	5.76	6.43	63,100	D.
December	2,480	176	933	5.07	5.84	57,400	C.
January	4,550	446	1,370	7.45	8.59	84,200	D.
February	3,050	372	845	4.59	4.78	46,900	C.
March	828	534	631	3.43	3.95	38,800	C.
April	2,930	584	997	5.42	6.05	59,300	C.
May	3,170	900	1,510	8.21	9.46	92,800	D.
June	5,460	1,300	2,040	11.1	12.38	121,000	D.
July	1,950	488	895	4.86	5.60	55,000	C.
August	488	176	298	1.62	1.87	18,300	C.
September	900	176	340	1.85	2.06	20,200	C.
The year	5,590	176	966	5,25	71.31	699,000	
1909–10.							
October	975	338	552	3.00	3.46	33,900	C.
December 21–31	930	516	644	3.50	1.43	14,100	C.
January	4,450	342	1,210	6.58	7.59	74,400	C.
February	2,760	438	842	4.57	4.76	46,800	C.
March	5,490	1,000	2,340	12.7	14.64	144,000	C.
April	3,340	1,000	1,710	9.29	10.36	102,000	C.
May	4,840	1,080	1,880	10.2	11.76	116,000	C.
June	3,220	648	1,070	5.82	6.49	63,700	C.
July	748	372	554	3.01	3.47	34,100	C.
August	372	222	256	1.39	1.60	15,700	C.
September	558	174	214	1.16	1.29	12,700	C.
1910–11.							
October	7,960	516	1,840	10.0	11.53	113,000	C.
November 1–20	8,350	648	2,040	11.1	8.25	80,900	C.
March 16–31	1,140	638	845	4.59	2.73	26,800	C.
April	1,140	488	719	3.91	4.36	42,800	C.
May	2,260	975	1,400	7.61	8.77	86,100	D.
June	2,980	864	1,350	7.34	8.19	80,300	D.
July	1,330	476	799	4.34	5.00	49,100	C.
August	476	372	403	2.19	2.52	24,800	C.
September	2,320	372	727	3.95	4.41	43,300	C.
1911–12.							
October	1,140	276	369	2.01	2.32	22,700	C.
November	....	276	3,040	16.5	18.41	181,000	D.
December	2,280	710	1,390	7.55	8.70	85,500	C.
January	8,130	565	1,840	10.0	11.53	113,000	C.
February	3,090	635	1,370	7.45	8.04	78,800	C.
March	875	200	429	2.33	2.69	26,400	C.
April	1,370	635	856	4.65	5.19	50,900	C.
May	4,440	790	1,960	10.7	12.34	121,000	C.
June	2,590	1,160	1,610	8.75	9.76	95,800	C.
July	1,850	370	745	4.05	4.67	45,800	C.
August	1,060	255	356	1.93	2.22	21,900	C.
September	3,270	292	716	3.89	4.34	42,600	D.
The year	....	200	1,220	6.63	90.21	885,000	

Monthly discharge of Middle Fork of Snoqualmie River near North Bend, Wash., for the years ending Sept. 30, 1907–1915—Continued.

Month.	Discharge in second-feet.				Run-off.		Accuracy.
	Maximum.	Minimum.	Mean.	Per square mile.	Depth in inches on drainage area.	Total in acre-feet.	
1912–13.							
October	1,080	391	685	3.72	4.29	42,100	D.
November	3,590	580	1,560	8.48	9.46	92,800	D.
December	2,390	711	1,040	5.65	6.51	64,000	D.
January	....	358	1,040	5.65	6.51	64,000	D.
February	3,920	421	1,100	5.98	6.23	61,100	D.
March	1,520	730	1,000	5.43	6.26	61,500	C.
April	....	912	1,410	7.66	8.55	83,900	C.
May	....	....	....	....	....	....	
June	4,500	1,700	2,650	14.4	16.07	158,000	C.
July	2,480	779	1,600	8.70	10.03	98,400	B.
August	838	335	526	2.86	3.30	32,300	C.
September	3,360	300	672	3.65	4.07	40,000	B.
1913–14.							
October	8,170	270	1,720	9.35	10.78	106,000	B.
November	3,190	636	1,410	7.66	8.55	83,900	B.
December	1,570	508	808	4.39	5.06	49,700	B.
January	8,100	606	1,710	9.29	10.71	105,000	B.
February	2,080	488	846	4.60	4.79	47,000	B.
March	2,860	654	1,300	7.07	8.15	79,900	B.
April	3,550	600	1,550	8.42	9.39	92,200	B.
May	2,700	1,010	1,680	9.13	10.53	103,000	B.
June	2,080	838	1,320	7.17	8.00	78,600	B.
July	1,130	295	576	3.13	3.61	35,400	B.
August	295	189	240	1.30	1.50	14,800	B.
September	1,380	169	460	2.50	2.79	27,400	B.
The year	8,170	169	1,140	6.20	83.86	823,000	
1914–15.							
October	2,940	328	909	4.94	5.70	55,900	B.
November	7,680	806	2,090	11.4	12.72	124,000	B.
December	727	306	429	2.33	2.69	26,400	B.
January	898	355	548	2.98	3.44	33,700	B.
February	739	427	542	2.95	3.07	30,100	B.
March	1,800	394	842	4.58	5.28	51,800	B.
April	6,790	569	1,490	8.10	9.04	88,700	B.
May	3,360	467	852	4.63	5.34	52,400	B.
June	935	452	598	3.25	3.63	35,600	A.
July	833	318	448	2.43	2.80	27,500	A.
August	313	182	228	1.24	1.43	14,000	A.
September	451	150	196	1.07	1.19	11,700	A.
The year	7,680	150	762	4.14	56.33	552,000	

SNOQUALMIE RIVER NEAR SNOQUALMIE, WASH.

Location.—In the NE. ¼ sec. 33, T. 24 N., R. 8 E., 300 feet below mouth of the South Fork, 4 miles above mouth of Tokul Creek, and 2 miles east of Snoqualmie, in King County.

Drainage area.—371 square miles (measured on topographic and county maps).

Records available.—Revised data for following periods published in this report: May 1, 1898, to July 12, 1899; January 1 to July 16, 1900; and September 14, 1902, to July 31, 1904. Gage heights for 1902–1906 published in Water-Supply Papers 85, 100, 135, 178, and 214. Data insufficient for ascertaining discharge after July 31, 1904.

Gage.—May 1, 1898, to July 16, 1900, staff gage at dam site just above Snoqualmie Falls; gage-height record continued until December 31, 1901, but data insufficient for ascertaining discharge after July 16, 1900. September 14, 1902, staff gage just below Tokul Creek, three-fourths mile below Snoqualmie Falls; destroyed December 1, 1902. November 3, 1902, staff gage on left bank 300 feet below South Fork 3¼ miles above Snoqualmie Falls, and 2 miles east of Snoqualmie, destroyed

January 3, 1903. January 7, 1903, staff gage in two sections installed at same site; datum raised 0.06 foot; read until September 30, 1905. Gage at Snoqualmie Falls used in November and December, 1906. Gage read to hundredths daily from November 3, 1902, to September 30, 1905, by E. C. Reinig.

Discharge measurements.—In 1898–99 made by floats from cable half a mile above the falls and from bridge. In September and October, 1902, from cable just above Tokul Creek. From November, 1902, to December, 1903, from cable 300 feet below South Fork.

Channel and control.—Channel composed of gravel; did not shift during periods covered by records. Flashboards placed on the dam at Snoqualmie Falls at low water affected stage-discharge relation at station above falls.

Extremes of discharge.—1898–1900, 1902–1904: Maximum stage recorded, 19.6 feet January 3, 1903 (discharge, 24,400 second-feet); minimum stage recorded, 3.55 feet September 4, 1903 (discharge, 388 second-feet).

Winter flow.—Stage-discharge relation not affected by ice.

Diversions.—None.

Regulation.—None.

Accuracy.—Rating curves well defined, except for September and October, 1902, and August 15 to October 6, 1903. Results excellent, except for short periods for which rating curves were not well defined or were extended for high water.

Discharge measurements of Snoqualmie River near Snoqualmie, Wash., during 1898–1903.

Date.	Made by—	Gage height.	Discharge.	Date.	Made by—	Gage height.	Discharge.
1898.		*Feet.*	*Sec.-ft.*	1902.		*Feet.*	*Sec.-ft.*
Sept. 7	B. E. Grant	[a] 53.90	492	Sept. 20	T. A. Noble	[c] 1.15	727
Oct. 4	do	[a] 55.70	1,290	Oct. 14	do	[c] 1.04	641
Nov. 23	do	[b] 57.32	3,340	Nov. 3	do	[d] 5.04	3,230
24	do	57.04	2,860	Dec. 14	do	3.37	1,890
26	do	56.40	2,210	17	do	2.76	1,380
29	do	56.92	2,560				
29	do	56.95	2,530	1903.			
Dec. 6	do	56.02	1,730	Jan. 29	T. A. Noble	3.86	2,040
8	do	55.74	1,510	Apr. 30	do	4.10	2,470
9	do	55.62	1,400	May 10	H. W. Quinan	5.70	4,050
10	do	55.48	1,250	30	do	7.56	6,420
15	do	55.05	1,040	June 5	do	8.70	8,280
19	do	57.00	2,870	6	do	6.49	5,210
27	do	63.60	14,100	9	do	5.32	3,680
				Aug. 26	do	3.97	693
1899.				28	do	3.94	637
Jan. 18	B. E. Grant	62.30	12,900	Dec. 29	G. H. Bliss	3.13	1,690
19	do	60.30	8,690	29	do	3.13	1,600
Feb. 18	do	59.60	6,500				

[a] Made by weighted rod floats.

[b] This and following measurements made in 1898–9 made with a Haskell meter.

[c] Referred to gage below Snoqualmie Falls.

[d] This and following measurements referred to gage above Snoqualmie Falls.

Daily discharge, in second-feet, of Snoqualmie River near Snoqualmie, Wash., for the years ending Sept. 30, 1898, 1899, 1900, 1902, 1903, and 1904.

Day.	May.	June.	July.	Aug.	Sept.	Day.	May.	June.	July.	Aug.	Sept.
1898.						1898.					
1	3,590	3,890	2,760	1,090	520	16	6,590	5,870	1,680	588	468
2	3,890	4,040	3,160	1,090	520	17	6,950	3,890	2,060	588	468
3	4,850	4,040	3,300	915	520	18	5,360	4,850	3,020	588	468
4	5,530	4,680	3,300	860	520	19	4,200	6,590	2,280	588	468
5	5,190	5,530	3,020	860	520	20	3,590	5,530	1,680	588	670
6	4,200	6,230	2,510	860	520	21	3,300	4,850	1,510	552	1,160
7	3,440	6,590	2,170	860	492	22	4,520	3,890	1,360	552	2,760
8	2,890	6,230	2,170	860	468	23	3,590	3,590	1,360	520	3,300
9	3,300	5,870	2,390	860	492	24	3,020	4,850	1,360	520	1,960
10	4,850	6,590	2,280	810	492	25	3,590	4,200	1,510	520	1,220
11	4,520	6,050	2,510	810	492	26	5,870	3,590	1,430	520	970
12	4,800	4,200	2,630	760	492	27	4,850	3,300	1,290	520	970
13	5,080	4,200	2,280	714	492	28	4,200	3,020	1,220	520	1,590
14	5,360	5,190	1,770	670	492	29	4,520	2,760	1,160	520	3,160
15	6,050	4,850	1,680	628	492	30	3,890	2,280	1,160	552	3,890
						31	3,300	....	1,090	552	....

Day.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.
1898–99.										
1	3,300	5,530	2,760	2,760	3,740	3,440	1,220	2,510	5,870	5,870
2	2,510	5,700	2,510	2,060	2,890	2,760	1,360	2,280	6,950	6,950
3	1,770	5,020	2,060	1,860	2,280	2,510	1,510	2,060	6,950	8,030
4	1,430	7,670	2,170	1,680	2,060	2,510	2,280	2,060	7,310	7,670
5	1,220	6,230	1,860	1,590	1,860	2,280	1,860	2,280	8,410	6,950
6	1,090	5,700	1,680	1,430	1,770	2,170	1,770	3,020	6,230	6,230
7	1,030	4,680	1,510	1,360	1,770	2,280	1,860	3,300	5,020	6,050
8	915	3,590	1,430	1,290	2,280	2,510	2,060	6,230	5,190	6,230
9	915	2,760	1,360	1,360	4,200	2,390	3,300	11,300	6,590	6,230
10	1,960	2,390	1,220	1,510	6,950	2,170	3,300	7,490	8,410	5,530
11	2,760	2,280	1,220	1,510	4,040	2,060	4,520	9,170	10,300	5,530
12	2,510	1,860	1,090	1,510	3,300	2,060	9,170	6,950	10,700	6,590
13	1,860	1,680	1,090	1,430	4,680	2,060	5,190	5,190	7,670	....
14	6,050	1,770	1,030	1,360	5,530	1,860	3,590	4,200	6,230	....
15	5,700	1,860	970	2,390	19,000	1,680	3,020	3,440	6,230	....
16	3,440	1,960	970	9,930	9,740	1,590	3,890	3,300	7,670	....
17	2,510	6,590	1,090	8,790	8,410	1,510	3,590	3,590	8,790	....
18	2,170	6,590	1,290	12,100	6,950	1,510	3,020	3,740	8,410	....
19	1,860	4,850	2,760	8,220	8,220	1,430	3,020	4,200	8,030	....
20	1,590	3,440	2,510	10,300	6,230	1,430	2,760	4,200	7,310	....
21	1,360	2,760	1,770	20,100	5,020	1,430	2,760	4,040	5,870	....
22	1,290	2,510	1,770	15,700	3,890	1,360	2,510	4,850	5,530	....
23	1,220	3,160	2,510	6,770	3,300	1,290	2,280	7,310	6,230	....
24	1,220	2,760	2,390	6,230	3,300	1,290	2,170	7,670	6,950	....
25	1,220	2,280	2,280	8,600	3,590	1,220	2,510	7,310	6,230	....
26	1,360	2,060	13,600	7,850	3,160	1,160	3,020	6,950	5,870	....
27	2,280	2,280	14,800	5,870	3,300	1,160	3,300	7,310	6,590	....
28	3,890	2,890	13,600	4,850	3,020	1,160	2,630	6,950	5,870	....
29	2,390	2,630	6,770	4,200	....	1,160	2,510	5,870	5,530	....
30	1,860	2,760	4,520	4,200	....	1,220	3,020	5,190	5,020	....
31	4,040	....	3,300	4,520	....	1,220	....	4,680	....	....

Daily discharge, in second-feet, of Snoqualmie River near Snoqualmie, Wash., for the years ending Sept. 30, 1898, 1899, 1900, 1902, 1903, and 1904—Continued.

Day.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.
1900.							
1	2,280	1,510	2,170	3,440	2,760	2,060	3,020
2	2,280	1,510	1,960	5,020	2,760	2,060	2,760
3	2,060	2,630	1,860	3,740	3,300	2,060	2,510
4	1,960	1,960	1,960	2,890	3,890	2,060	2,510
5	1,680	1,770	1,960	2,630	4,200	6,410	2,630
6	2,060	2,760	1,960	6,230	3,440	3,590	2,510
7	2,060	2,060	3,020	5,530	3,440	2,630	2,280
8	3,590	2,060	4,200	3,890	4,680	2,630	2,060
9	2,630	2,060	5,020	3,020	3,440	2,170	1,860
10	4,680	3,300	5,700	2,390	3,160	2,060	1,680
11	4,520	6,770	17,900	2,060	3,160	2,060	1,680
12	20,100	4,040	9,550	1,960	3,440	1,960	2,170
13	9,550	3,020	6,050	3,160	3,160	1,960	2,060
14	5,870	2,390	4,500	2,510	3,300	1,960	1,680
15	4,200	1,960	4,200	2,280	2,630	1,860	1,510
16	4,680	1,680	4,040	2,060	4,360	1,960	1,360
17	4,200	1,770	3,890	2,170	3,300	2,280	....
18	4,360	1,960	3,590	2,630	2,760	1,860	....
19	4,200	1,960	3,300	2,170	2,510	3,590	....
20	4,200	2,060	3,020	1,960	2,280	4,040	....
21	4,200	6,050	2,890	1,770	2,060	5,020	....
22	3,300	5,020	3,890	1,860	2,890	4,850	....
23	3,160	3,740	2,760	1,590	2,280	3,160	....
24	2,630	3,160	2,390	1,510	2,060	2,890	....
25	2,390	2,760	2,630	1,510	2,170	3,590	....
26	2,290	2,390	3,020	1,360	3,890	3,440	....
27	1,860	2,060	2,510	1,290	4,040	2,760	....
28	1,860	2,760	2,170	1,220	3,020	2,390	....
29	1,680	....	2,060	1,220	2,170	2,510	....
30	1,590	....	2,280	2,170	2,170	2,510	....
31	1,510	....	2,060	....	2,060	....	....

Day.	Sept.	Day.	Sept.	Day.	Sept.
1902.		1902.		1902.	
1	....	11	....	21	685
2	....	12	....	22	650
3	....	13	....	23	650
4	....	14	650	24	650
5	....	15	615	25	820
6	....	16	615	26	880
7	....	17	615	27	4,070
8	....	18	615	28	1,980
9	....	19	880	29	1,270
10	....	20	725	30	1,270

Daily discharge, in second-feet, of Snoqualmie River near Snoqualmie, Wash., for the years ending Sept. 30, 1898, 1899, 1900, 1902, 1903, and 1904—Continued.

Day.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.
1902–3.												
1	1,100	1,710	17,500	3,210	1,760	1,050	2,520	2,340	6,710	3,110	1,050	520
2	950	4,470	6,290	3,760	1,550	995	2,080	2,160	5,630	3,760	995	485
3	880	3,540	3,990	24,400	1,410	995	1,920	2,610	4,230	3,210	945	420
4	820	2,520	5,110	24,000	1,280	895	1,840	3,430	3,540	2,910	895	388
5	820	1,690	3,650	10,000	1,220	850	1,690	3,870	3,650	3,110	895	394
6	725	1,690	2,810	6,000	1,160	850	1,550	4,590	5,110	3,210	895	625
7	725	2,250	2,250	4,720	1,160	995	1,840	3,760	6,570	2,910	895	6,940
8	770	4,850	2,080	4,350	1,160	945	2,250	3,760	8,390	3,010	850	4,210
9	770	3,210	6,150	4,590	1,410	895	1,760	5,240	8,530	2,910	850	1,820
10	725	3,760	3,540	3,990	2,710	1,280	1,550	4,350	8,390	2,810	850	7,080
11	725	4,720	2,610	3,210	1,840	3,110	1,480	3,430	8,250	2,710	850	5,260
12	725	4,470	2,160	2,710	1,550	1,920	1,280	4,230	7,690	2,520	805	3,820
13	685	3,010	2,160	2,340	1,340	1,410	1,220	5,500	5,760	2,250	805	3,460
14	650	2,250	1,920	2,250	1,220	1,340	1,220	6,020	6,020	2,520	805	1,630
15	685	1,920	1,690	2,250	1,160	1,220	1,220	5,240	5,630	2,160	....	1,270
16	725	2,910	1,550	2,080	1,050	1,100	1,160	4,980	5,110	2,160	....	1,060
17	770	3,990	1,410	1,920	1,050	1,050	1,220	4,350	4,980	2,160	....	855
18	725	4,720	1,340	2,080	995	995	1,340	3,430	4,110	2,080	....	815
19	685	3,210	1,220	2,340	995	945	1,340	3,990	4,350	2,080	555	775
20	685	2,430	1,410	2,520	995	945	1,340	3,430	4,590	2,080	590	895
21	685	2,000	1,480	7,270	1,050	945	1,690	3,210	4,350	2,080	555	6,100
22	725	2,080	1,550	5,760	1,100	945	2,520	3,010	3,760	1,760	520	3,460
23	725	2,160	1,410	3,650	1,220	995	2,520	3,010	4,110	1,760	590	1,920
24	685	1,690	1,840	6,710	1,220	1,050	2,250	3,110	3,760	1,620	625	1,920
25	650	1,920	10,600	6,850	1,160	1,410	2,710	3,650	4,110	1,480	662	5,260
26	650	1,620	9,100	4,230	1,160	1,410	4,110	6,290	3,430	1,220	700	4,210
27	615	1,690	4,980	3,320	1,160	1,410	3,460	4,230	4,980	1,220	662	1,450
28	950	1,620	3,430	2,610	1,100	2,430	2,810	4,050	6,020	1,220	662	1,450
29	1,020	1,550	2,710	2,250	....	3,990	2,520	3,870	3,870	1,160	625	2,650
30	1,710	1,690	3,430	2,080	....	3,760	2,340	6,570	3,110	1,100	625	2,020
31	2,280	....	4,230	1,920	....	3,110	....	6,710	....	1,100	625	....

Day.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.
1903–4.										
1	1,180	1,410	8,110	1,840	1,410	1,160	1,690	3,010	3,540	3,990
2	1,020	1,410	9,100	1,840	1,280	1,050	1,690	2,710	3,320	3,990
3	1,180	1,840	5,110	1,690	1,280	1,100	1,690	2,710	3,540	3,540
4	1,270	2,340	3,650	2,000	1,410	1,280	1,620	2,710	3,870	2,910
5	4,470	2,810	3,650	1,690	1,690	1,840	2,080	2,610	4,470	2,610
6	6,520	7,970	2,520	1,620	1,620	3,540	3,540	2,430	4,720	2,430
7	6,150	5,110	2,000	2,340	1,480	7,550	2,340	2,340	4,110	2,340
8	3,540	3,320	1,760	3,010	1,410	5,500	2,520	2,340	2,710	2,080
9	2,520	3,210	1,690	2,910	1,280	3,650	2,610	2,000	2,710	2,000
10	2,810	2,810	1,690	2,710	1,160	2,910	3,210	2,080	2,910	2,000
11	3,760	2,520	1,760	2,610	1,160	2,340	3,320	2,160	3,110	1,690
12	4,720	2,250	1,840	10,900	1,160	2,080	7,690	2,520	3,110	1,410
13	3,990	2,000	2,910	11,200	1,160	1,840	9,700	3,210	3,540	1,340
14	2,520	1,840	3,010	13,600	1,160	1,760	9,250	4,230	3,760	1,340
15	2,080	1,690	3,990	3,990	1,100	1,550	7,830	3,540	3,760	1,340
16	1,690	1,620	4,590	4,980	1,160	1,480	6,150	2,710	3,760	1,690
17	1,550	1,410	4,720	4,470	1,050	1,480	4,470	3,110	4,980	1,690
18	1,410	1,340	3,320	3,540	1,050	1,410	4,230	3,320	4,980	1,480
19	1,340	1,280	2,810	2,520	995	1,480	4,590	4,230	4,590	1,410
20	1,160	1,410	4,110	2,340	995	1,480	4,720	3,870	4,720	1,410
21	1,100	1,220	4,350	2,340	995	1,340	5,630	4,720	3,760	1,410
22	1,050	3,110	4,230	2,430	2,810	1,280	4,470	4,590	3,320	1,410
23	995	3,110	3,650	2,520	2,430	1,160	3,540	4,470	2,910	1,410
24	945	3,010	2,810	2,250	1,840	1,100	2,910	3,990	2,250	1,280
25	945	3,010	2,430	2,160	1,620	1,050	2,810	3,320	2,340	1,160
26	850	3,320	2,000	1,920	1,410	995	2,910	3,540	2,710	1,100
27	850	6,430	1,840	1,760	1,340	945	3,760	4,110	3,110	1,050
28	1,160	8,250	1,760	1,620	1,280	1,280	5,240	4,110	3,430	945
29	3,110	5,500	1,760	1,550	1,280	1,840	5,760	3,990	3,760	945
30	2,160	11,000	1,620	1,410	....	1,760	4,470	3,990	3,990	895
31	1,410	....	1,690	1,410	....	1,690	....	3,760	....	895

NOTE.—Discharge determined as follows: May 1, 1898, to July 16, 1900, from rating curve well defined below and fairly well defined above 5,000 second-feet; May 12, 13, 1898, and July 2, 1900, interpolated; Sept. 14 to Nov. 2, 1902, from poorly defined rating curve; Nov. 3, 1902, to Aug. 14, 1903, and Oct. 7, 1903, to July 31, 1904, from rating curve well defined between 1,000 and 10,000 second-feet; Aug. 15, 1903, to Oct. 6, 1903, from poorly defined rating curve. Jan. 4-6, 1903, gage washed out; discharge estimated from records of Cedar and South Fork of Skykomish rivers at 24,000, 10,000, and 6,000 second-feet, respectively. Aug. 15, 1903, false work on dam raised 4 feet; 4 days, Aug. 15-18, allowed for erecting false work; discharge estimated at 680 second-feet.

Monthly discharge of Snoqualmie River near Snoqualmie, Wash., for the years ending Sept. 30, 1898–1904.

[Drainage area, 371 square miles.]

Month.	Discharge in second-feet.				Run-off.		Accuracy.
	Maximum.	Minimum.	Mean.	Per square mile.	Depth in inches on drainage area.	Total in acre-feet.	
1898.							
May	6,950	2,890	4,480	12.1	13.95	275,000	B.
June	6,590	2,280	4,710	12.7	14.17	280,000	B.
July	3,300	1,090	2,040	5.50	6.34	125,000	A.
August	1,090	520	691	1.86	2.14	42,500	A.
September	3,890	468	1,030	2.78	3.10	61,300	A.
The period	....	....	....	....	....	784,000	
1898–99.							
October	6,050	915	2,220	5.98	6.89	136,000	A.
November	7,670	1,680	3,610	9.73	10.86	215,000	A.
December	14,800	970	3,220	8.68	10.01	198,000	A.
January	20,100	1,290	5,270	14.2	16.37	324,000	C.
February	19,000	1,770	4,800	12.9	13.43	267,000	B.
March	3,440	1,160	1,800	4.85	5.59	111,000	A.
April	9,170	1,220	2,970	8.01	8.94	177,000	A.
May	11,300	2,060	5,120	13.8	15.91	315,000	B.
June	10,700	5,020	6,930	18.7	20.86	412,000	B.
July 1-12	8,030	5,530	6,490	17.5	7.81	154,000	B.
The period	....	....	....	....	....	2,310,000	
1900.							
January	20,100	1,510	3,790	10.2	11.76	233,000	A.
February	6,770	1,510	2,760	7.44	7.75	153,000	A.
March	17,900	1,860	3,820	10.3	11.87	235,000	B.
April	6,230	1,220	2,570	6.93	7.73	153,000	A.
May	4,680	2,060	3,060	8.25	9.51	188,000	A.
June	6,410	1,860	2,810	7.57	8.45	167,000	A.
July 1-16	3,020	1,360	2,140	5.77	3.43	67,900	A.
The period	....	....	....	....	....	1,200,000	
1902.							
September 14-30	4,070	615	1,040	2.80	1.77	35,100	D.
1902–3.							
October	2,280	615	840	2.26	2.61	51,600	D.
November	4,850	1,550	2,710	7.30	8.14	161,000	A.
December	17,500	1,220	3,730	10.1	11.64	229,000	A.
January	24,400	1,920	5,140	13.9	16.03	316,000	C.
February	2,710	995	1,290	3.48	3.62	71,600	A.
March	3,990	850	1,460	3.94	4.54	89,800	A.
April	4,110	1,160	1,960	5.28	5.89	117,000	A.
May	6,710	2,160	4,140	11.2	12.91	255,000	A.
June	8,530	3,110	5,290	14.3	15.95	315,000	A.
July	3,760	1,100	2,240	6.04	6.96	138,000	A.
August	1,050	520	745	2.01	2.32	45,800	C.
September	7,080	388	2,440	6.58	7.34	145,000	D.
The year	24,400	388	2,670	7.20	97.95	1,930,000	
1903–4.							
October	6,520	850	2,240	6.04	6.96	138,000	C.
November	11,000	1,220	3,250	8.76	9.77	193,000	A.
December	9,100	1,620	3,240	8.73	10.06	199,000	A.
January	13,600	1,410	3,330	8.98	10.35	205,000	B.
February	2,810	995	1,380	3.72	4.01	79,400	A.
March	7,550	945	1,970	5.31	6.12	121,000	A.
April	9,700	1,620	4,210	11.3	12.61	251,000	A.
May	4,720	2,000	3,300	8.89	10.25	203,000	A.
June	4,980	2,250	3,590	9.68	10.80	214,000	A.
July	3,990	895	1,780	4.80	5.53	109,000	A.
The period	....	....	....	....	....	1,710,000	

NORTH FORK OF SNOQUALMIE RIVER AT CABLE BRIDGE, NEAR NORTH BEND, WASH.

Location.—In the NE. ¼ NE. ¼ sec. 13, T. 24 N., R. 8 E., 300 feet below Hancock Creek, 600 feet above the cable bridge, 6 miles above the mouth, and 6 miles northeast of North Bend, in King County.

Drainage area.—80 square miles (measured on topographic and county maps).

Records available.—November 7, 1913, to October 17, 1915, when station was discontinued.

Gage.—Since November 7, 1913, Friez water-stage recorder on left bank 600 feet above cable bridge; before that date, a vertical staff attached to overhanging tree, at same location as present gage but at datum 0.23 foot higher, read once a week to tenths. Record prior to November 7, 1913, unreliable; not published.

Discharge measurements.—Made from cable or by wading.

Channel and control.—Large boulders, and gravel; permanent; one channel at all stages; gradient very steep; both banks high and wooded.

Extremes of discharge.—Maximum stage during year, from water-stage recorder, 5.7 feet at 11 p. m. April 2 (discharge, 3,280 second-feet); minimum stage recorded, 0.59 foot September 5–7 (discharge, 74 second-feet).

1913–1915: Maximum stage recorded, 6.4 feet at 2 a. m. January 5, 1914 (discharge, 3,840 second-feet); minimum stage recorded, 0.54 foot August 29 to September 2, 1914 (discharge, 67 second-feet).

Winter flow.—Stage-discharge relation not affected by ice.

Diversions.—None.

Regulation.—None.

Accuracy.—Results excellent.

Cooperation.—Gage-height record and some discharge measurements furnished by Puget Sound Traction, Light & Power Co.

Discharge measurements of North Fork of Snoqualmie River at cable bridge, near North Bend, Wash., during 1908–1916.

Date.	Made by—	Gage height.	Discharge.
1908.		*Feet.*	*Sec.-ft.*
Sept. 23	M. T. Crawford	0.40	64
1909.			
Aug. 24	M. T. Crawford	.50	65
1910.			
June 30	M. T. Crawford	1.12	254
1911.			
Sept. 11	G. L. Parker	.88	155
1913.			
June 5	Rose and Ernisse	2.60	1,120
July 24	Tuttle and Rose	1.85	582
1914.			
May 10	Weller Rose	2.38	848
Aug. 19	Collier and Rose	.59	70
1915.			
Mar. 21	McFadden and Hartson	1.97	612
Aug. 25	R. C. McFadden	.57	74
1916.			
Apr. 3	Hartson and McFadden	2.21	722
3	McFadden and Hartson	2.20	743
Aug. 10	J. T. Hartson	1.41	315

Daily discharge, in second-feet, of North Fork of Snoqualmie River at cable bridge, near North Bend, Wash., for the period Nov. 7, 1913, to Oct. 17, 1915.

Day.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.
1913-14.											
1	....	800	257	460	1,320	287	752	788	532	107	67
2	....	668	269	385	860	300	892	776	500	105	67
3	....	576	300	346	668	521	958	680	475	100	68
4	....	521	1,600	365	626	830	758	532	440	98	68
5	....	480	3,200	332	543	990	626	475	360	96	70
6	....	485	2,880	291	510	710	609	425	327	94	70
7	587	500	2,090	273	554	632	650	425	309	102	70
8	510	455	1,360	261	668	638	650	1,420	291	107	71
9	495	405	958	250	632	692	650	1,120	278	96	87
10	576	370	716	265	548	740	830	860	261	94	89
11	490	420	644	336	516	662	788	764	250	92	87
12	440	505	582	355	554	644	776	770	242	89	100
13	380	445	532	400	860	925	892	722	242	85	111
14	341	465	490	390	1,740	1,060	1,020	680	238	82	115
15	370	543	495	370	1,150	1,670	892	758	246	78	485
16	2,020	460	543	375	1,460	1,060	764	752	198	77	425
17	1,880	400	500	365	1,090	830	680	686	176	78	415
18	770	360	450	355	925	830	638	609	176	78	614
19	548	332	400	390	860	1,150	604	510	180	77	638
20	543	300	360	435	860	1,090	662	460	173	75	800
21	495	273	370	538	782	752	758	592	164	74	620
22	587	257	609	830	692	626	758	565	150	72	390
23	680	242	495	716	565	582	740	465	148	72	287
24	1,420	226	440	734	532	526	644	565	142	72	226
25	892	216	435	638	485	495	716	686	137	71	192
26	800	212	455	526	430	543	704	554	132	70	212
27	788	216	405	1,280	380	644	680	560	127	70	405
28	728	253	351	860	351	582	656	543	123	68	322
29	800	226	336	....	341	538	548	532	120	67	257
30	830	206	370	....	318	592	548	532	115	67	216
31	....	226	415	....	304	....	668	....	109	67	....

Day.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.
1914-15.													
1	198	892	470	728	445	295	1,310	304	582	230	156	78	130
2	430	1,420	430	656	440	273	2,760	295	538	212	148	80	1,600
3	435	1,640	400	543	385	257	2,210	385	490	198	142	80	1,250
4	332	1,280	370	480	341	400	1,450	380	465	183	135	77	668
5	265	1,390	341	420	380	440	990	400	455	173	127	74	465
6	226	1,150	313	370	505	395	800	440	440	170	123	74	351
7	195	860	291	351	450	390	830	480	405	170	115	74	278
8	176	794	269	410	420	360	734	450	351	170	111	98	230
9	156	764	250	440	460	341	609	470	313	176	111	148	206
10	410	620	234	415	445	336	576	576	300	164	109	130	212
11	990	1,460	220	650	390	336	626	565	291	159	107	109	209
12	860	1,060	209	644	346	313	782	485	278	189	102	100	341
13	680	1,390	195	532	332	309	958	440	269	410	98	98	526
14	470	925	186	516	304	653	752	450	261	505	96	98	1,530
15	370	722	183	475	282	1,220	656	405	246	415	92	113	764
16	332	609	180	420	273	794	692	360	242	505	92	123	548
17	770	538	173	380	341	626	734	385	238	576	92	111	455
18	1,250	480	170	355	526	782	680	500	230	460	92	100	......
19	1,320	576	167	395	400	604	638	592	304	380	90	94	......
20	1,020	1,500	159	410	346	548	604	604	475	318	89	89	......
21	710	958	153	395	327	632	485	516	380	273	87	85	......
22	548	728	150	365	309	782	420	505	309	246	85	82	......
23	470	716	142	327	291	830	385	470	278	220	85	78	......
24	420	644	140	304	287	746	390	543	250	206	84	78	......
25	395	604	140	278	385	598	380	644	246	189	80	77	......
26	346	830	170	257	346	485	410	698	385	180	78	75	......
27	300	650	195	241	304	435	395	1,230	370	173	77	78	......
28	261	609	313	234	295	450	400	1,890	318	167	75	78	......
29	234	565	261	226	......	668	420	1,130	273	161	75	77	......
30	313	516	304	226	......	728	360	830	250	161	75	77	......
31	465	......	722	261	......	592	....	668	......	159	75	....	......

NOTE.—Discharge ascertained from a rating curve well defined between 60 and 1,200 second-feet. Discharge computed by subdivided days Mar. 14-15, Apr. 1-5, and May 27-29, 1915.

Monthly discharge of North Fork of Snoqualmie River at cable bridge, near North Bend, Wash., for the years ending Sept. 30, 1914–15.

Month.	Discharge in second-feet.			Run-off (total in acre-feet).	Accuracy.
	Maximum.	Minimum.	Mean.		
1913–14.					
November 7–30	2,020	341	749	35,700	A.
December	800	206	388	23,900	A.
January	3,200	257	752	46,200	A.
February	1,280	250	469	26,000	A.
March	1,740	304	714	43,900	A.
April	1,670	287	738	43,900	A.
May	1,020	548	726	44,600	A.
June	1,420	425	660	39,300	A.
July	532	109	237	14,600	A.
August	107	67	83.2	5,120	A.
September	800	67	255	15,200	A.
The period				338,000	
1914–15.					
October	1,320	156	495	30,400	A.
November	1,640	480	896	53,300	A.
December	722	140	255	15,700	A.
January	728	226	410	25,200	A.
February	526	273	370	20,500	A.
March	1,220	257	536	33,000	A.
April	2,760	360	781	46,500	A.
May	1,890	295	584	35,900	A.
June	582	230	341	20,300	A.
July	576	159	255	15,700	A.
August	156	75	100	6,150	A.
September	148	74	91.1	5,420	A.
The year	2,760	74	425	308,000	

NOTE.—Oct. 1–17, 1915, mean discharge, 574 second-feet; total run-off, 19,400 acre-feet.

NORTH FORK OF SNOQUALMIE RIVER NEAR NORTH BEND, WASH.

LOCATION.—In sec. 34, T. 24 N., R. 8 E., at highway bridge one-eighth mile above mouth and 2 miles north of North Bend, in King County.

DRAINAGE AREA.—102 square miles (measured on topographic and county maps).

RECORDS AVAILABLE.—July 4, 1907, to September 30, 1915.

GAGE.—Since September 2, 1912, Fuller water-stage recorder on left abutment of highway bridge; before that date, a vertical staff at same location and datum, read once every second day, to tenths, July 21, 1907, to February 29, 1908, and once each day, to tenths, July 1, 1908, to September 2, 1912, by M. H. Norman.

DISCHARGE MEASUREMENTS.—Made from a cable or by wading.

CHANNEL AND CONTROL.—Sand and gravel; shifting at high stages. Banks fairly high, not subject to overflow. One channel at all stages. Backwater from the Middle Fork probably reaches station when that stream is high.

EXTREMES OF DISCHARGE.—Maximum stage during year ending September 30, 1915, from water-stage recorder, 7.65 feet at 8 p. m. April 2 (discharge, 4,270 second-feet); minimum stage recorded, 1.82 feet September 30 (discharge, 71 second-feet).

1907–1915: Maximum stage recorded, 14.5 feet (by levels to high-water mark) November 18, 1911 (discharge, 11,100 second-feet). Water above gage November 18, 19, 23, 24, 29, and 30, 1909, and stage may have exceeded that in 1911. Minimum stage recorded, 2.16 feet September 5–7, 1914 (discharge, 59 second-feet).

WINTER FLOW.—Stage-discharge relation not affected by ice.

DIVERSIONS.—None.

REGULATION.—None.

ACCURACY.—Results for periods previous to installation of water-stage recorder, fair; since that time, good.

COOPERATION.—Gage-height record and some discharge measurements furnished by Puget Sound Traction, Light & Power Co.

Discharge measurements of North Fork of Snoqualmie River near North Bend, Wash., during 1907–1915.

Date.	Made by—	Gage height.	Discharge.	Date.	Made by—	Gage height.	Discharge.
1907.		*Feet.*	*Sec.-ft.*	1912.		*Feet.*	*Sec.-ft.*
July 4	A. S. Kalenborn	3.02	763	Apr. 25	Weller Rose	2.85	409
Aug. 8	do	1.60	221	May 9	do	4.34	1,230
Sept. 17	do	3.30	901	9	H. C. Hanson	4.34	1,220
				July 29	Weller Rose	1.82	196
1908.							
Sept. 24	M. T. Crawford	1.09	144	1913.			
				Jan. 4	Eernisse and Rose	4.41	1,450
1909.				28	L. M. Severtson	3.56	790
Aug. 25	A. T. Harris	1.15	143	June 4	J. G. Eernisse	4.52	1,520
				July 23	Tuttle and Rose	3.15	616
1910.				Sept. 18	Rose and Mason	1.58	193
Mar. 17	do	5.05	2,270	Oct. 11	Hartson and Beery	8.15	4,620
June 30	Crawford and Easter	2.18	294				
Sept. 21	R. R. Easter	1.20	77	1914.			
21	do	1.20	80	May 7	Weller Rose	3.98	875
Oct. 19	M. T. Crawford	3.58	827	Aug. 20	Collier and Rose	2.26	77
1911.				1915.			
Mar. 15	R. R. Easter	2.20	255	Jan. 12	McFadden and Brown	3.74	853
Sept. 10	M. T. Crawford	2.04	234	12	Brown and McFadden	3.71	831
10	G. L. Parker	2.04	243	Mar. 18	McFadden and Hartson	3.94	969
Oct. 10	R. R. Easter	1.90	198	19	do	3.60	736
				Apr. 4	McFadden and Wilbur	5.19	1,990
1912.				July 7	R. C. McFadden	2.40	216
Jan. 9	Weller Rose	2.90	336	Aug. 12	do	2.06	115
Feb. 21	do	3.30	669	Sept. 2	do	1.89	82
Mar. 28	do	2.60	333				

Daily discharge, in second-feet, of North Fork of Snoqualmie River near North Bend, Wash., for the years ending Sept. 30, 1907–1915.

Day.	July.	Aug.	Sept.	Day.	July.	Aug.	Sept.	Day.	July.	Aug.	Sept.
1907.				1907.				1907.			
1	......	153	202	11	......	192	183	21	183	160	328
2	......	153	212	12	......	202	175	22	175	167	300
3	......	150	223	13	......	212	167	23	167	167	271
4	750	147	223	14	......	223	......	24	167	167	271
5	......	144	223	15	......	223	......	25	167	264	271
6	......	141	212	16	......	223	......	26	167	360	258
7	750	182	202	17	......	223	913	27	167	281	246
8	......	223	192	18	......	223	832	28	167	202	224
9	......	203	183	19	......	188	750	29	167	202	202
10	......	183	183	20	......	153	539	30	160	202	202
								31	153	202	......

Daily discharge, in second-feet, of North Fork of Snoqualmie River near North Bend, Wash., for the years ending Sept. 30, 1907–1915—Continued.

Day.	Oct.	Nov.	Dec.	Jan.	Feb.	July.	Aug.	Sept.
1907–8.								
1	202	208	....	412	258	750	202	246
2	236	223	....	430	246	803	183	202
3	271	276	....	412	234	750	183	183
4	271	328	....	394	223	699	183	167
5	271	300	699	522	308	699	183	167
6	236	271	....	649	394	555	183	153
7	202	271	....	649	361	555	167	153
8	212	271	....	649	328	601	167	246
9	223	227	....	602	300	649	167	202
10	203	183	....	555	271	555	167	183
11	183	175	555	555	271	601	167	167
12	183	167	627	555	271	649	167	153
13	183	175	699	512	271	649	167	153
14	203	183	564	469	271	555	167	153
15	223	272	430	432	300	555	167	153
16	195	360	379	394	328	555	167	153
17	167	377	328	474	442	511	153	153
18	160	394	328	555	555	511	153	153
19	153	522	328	602	474	511	153	141
20	153	649	442	649	394	511	153	141
21	153	753	555	559	377	271	153	141
22	153	857	734	469	360	271	153	141
23	153	885	913	432	344	271	153	141
24	153	913	858	394	328	246	153	141
25	153	913	803	361	398	246	141	131
26	150	913	679	328	469	202	141	131
27	147	....	555	313	469	202	141	131
28	147	....	512	298	469	223	141	131
29	147	....	469	284	511	223	246	131
30	175	....	432	271	....	202	298	131
31	192	....	394	271	....	202	271	....

Day.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.
1908–9.												
1	153	971	298	803	328	511	750	857	4,770	803	271	183
2	153	750	153	1,090	360	469	555	971	5,170	803	298	167
3	153	649	430	2,900	555	469	469	1,380	1,960	750	271	153
4	131	469	394	1,460	469	469	430	1,620	1,620	750	271	153
5	167	360	394	1,090	430	469	430	857	1,460	699	271	153
6	167	360	360	971	430	469	430	803	1,220	699	246	153
7	167	360	394	971	430	394	469	803	1,160	649	246	141
8	167	298	430	601	394	394	511	750	1,220	803	202	141
9	183	298	430	469	360	469	511	857	1,300	803	202	141
10	202	298	555	394	328	394	469	857	1,460	750	183	153
11	223	271	699	360	328	360	511	913	1,620	1,300	183	153
12	246	246	750	328	298	360	511	750	1,300	859	183	131
13	298	246	857	328	271	360	555	750	1,090	699	183	131
14	360	202	649	328	271	360	699	750	1,090	511	183	131
15	469	183	511	328	430	360	699	750	1,160	430	183	131
16	469	202	469	699	1,300	328	649	803	1,030	430	183	131
17	469	601	394	750	1,460	360	511	803	971	394	183	153
18	328	3,180	360	1,960	1,380	394	511	803	913	394	167	153
19	360	1,160	328	2,800	1,090	360	394	857	971	328	167	153
20	430	1,030	328	1,880	803	360	394	803	913	328	153	430
21	328	1,090	298	1,880	750	360	394	699	913	328	153	555
22	328	1,160	298	971	469	394	394	649	857	298	141	511
23	298	1,380	430	857	555	394	430	601	750	298	141	328
24	328	1,300	430	750	555	394	649	857	750	298	131	298
25	328	649	803	649	649	430	1,620	913	857	298	147	246
26	328	601	601	601	649	469	1,790	1,220	857	271	167	223
27	328	511	1,090	511	699	469	1,030	1,620	857	271	167	246
28	328	394	1,220	511	601	469	1,030	1,160	803	271	167	202
29	601	360	1,300	430	....	469	1,160	1,090	803	271	153	511
30	1,220	328	1,160	430	....	511	750	1,300	857	271	131	511
31	1,380	....	1,030	328	....	555	....	1,880	....	271	131	....

Daily discharge, in second-feet, of North Fork of Snoqualmie River near North Bend, Wash., for the years ending Sept. 30, 1907–1915—Continued.

Day.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.
1909–10.												
1	511	......	3,180	469	1,300	1,960	857	803	1,110	300	108	78
2	511	......	2,900	430	971	3,470	803	803	641	268	92	78
3	699	......	2,800	430	803	3,280	750	803	543	268	92	78
4	601	......	1,540	430	699	2,320	803	803	543	239	92	78
5	555	......	1,090	430	555	1,880	913	857	591	239	92	78
6	511	......	913	430	555	1,380	1,160	913	591	239	92	78
7	649	......	857	430	511	1,160	1,220	1,220	641	239	78	108
8	511	......	750	430	469	1,090	1,220	1,220	591	239	78	92
9	430	......	750	430	469	971	1,300	1,220	591	239	78	78
10	328	......	699	430	469	1,090	1,300	3,970	591	268	78	78
11	328	......	699	328	430	1,220	1,300	3,210	1,810	268	78	78
12	328	......	3,180	328	430	1,540	1,220	2,070	1,050	268	78	78
13	328	......	2,700	328	430	1,700	1,160	1,480	641	268	78	78
14	298	......	2,140	328	469	1,880	1,030	1,110	641	239	78	66
15	271	......	2,050	328	469	1,960	971	982	641	239	78	66
16	246	......	1,160	328	430	1,790	913	802	591	239	78	66
17	246	......	1,300	328	430	2,230	913	860	497	213	78	78
18	223	......	750	430	394	2,230	1,030	982	411	168	78	92
19	223	......	649	430	394	2,520	1,620	860	335	146	78	92
20	223	......	649	360	360	2,050	2,050	693	591	146	78	78
21	246	......	601	360	360	1,880	1,220	693	497	146	78	78
22	394	......	555	2,050	360	1,790	2,050	920	411	146	78	78
23	298	......	511	2,990	360	1,700	1,700	1,050	411	146	78	66
24	328	......	511	3,080	469	1,220	1,700	1,320	300	146	78	66
25	328	......	469	2,140	803	1,090	2,050	1,480	300	146	78	66
26	298	......	469	971	913	1,030	2,050	860	411	146	78	56
27	271	......	430	971	1,460	857	1,300	920	372	146	78	56
28	246	......	430	971	1,880	857	971	747	335	126	78	56
29	298	......	430	750	......	803	913	802	335	126	78	66
30	394	......	555	913	......	803	750	860	300	126	78	300
31	430	......	649	913	......	971	......	920	......	126	78	......
1910–11.												
1	2,070	531	488	488	318	176	624	576	1,640	576	155	98
2	1,480	488	780	488	318	176	531	726	954	624	155	98
3	3,310	836	836	411	292	176	377	1,020	894	531	134	98
4	2,110	624	780	531	267	179	346	1,720	726	624	115	83
5	1,080	488	836	780	267	198	346	1,570	531	531	115	83
6	1,020	1,570	1,020	1,080	267	198	318	1,020	531	624	98	243
7	2,650	3,020	1,080	1,570	243	243	292	894	624	576	98	267
8	1,280	1,280	894	1,210	243	292	292	954	576	531	98	267
9	1,020	836	894	1,080	243	292	318	780	726	488	98	292
10	780	5,580	674	780	243	267	488	726	836	448	98	232
11	531	2,030	576	674	292	292	411	674	1,350	411	98	292
12	488	1,500	488	531	243	243	377	674	1,500	411	98	292
13	411	1,080	411	448	243	220	377	954	1,500	411	98	1,350
14	377	954	377	346	243	220	346	726	1,080	448	98	1,350
15	346	726	346	346	243	267	318	674	1,080	448	83	1,280
16	292	531	448	346	220	346	318	674	954	448	83	1,210
17	1,800	488	448	346	220	377	346	1,150	624	448	83	726
18	1,640	448	411	377	243	411	411	1,570	576	346	83	531
19	836	488	377	411	243	411	377	1,500	576	346	83	411
20	624	1,640	377	346	243	531	377	1,020	531	318	176	411
21	726	6,580	411	346	220	531	411	954	531	267	176	377
22	448	2,200	346	318	220	531	448	780	531	220	155	346
23	377	1,950	2,200	318	220	894	488	780	411	220	115	318
24	448	1,210	1,500	318	220	894	674	780	411	220	115	318
25	1,280	894	894	292	198	726	726	780	411	220	115	292
26	836	726	726	267	198	488	576	836	448	198	115	267
27	531	624	836	267	198	411	674	836	531	176	98	243
28	411	576	674	267	176	377	576	836	726	176	98	220
29	346	576	624	267	......	377	488	954	624	155	98	220
30	318	531	726	243	......	448	488	1,080	624	155	98	220
31	292	......	624	346	......	488	......	1,350	......	155	98	......

Daily discharge, in second-feet, of North Fork of Snoqualmie River near North Bend, Wash., for the years ending Sept. 30, 1907–1915—Continued.

Day.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.
1911-12.												
1	198	134	875	377	1,030	268	407	677	915	789	207	1,840
2	198	134	749	337	967	243	489	533	635	683	193	985
3	176	134	688	337	730	243	489	533	635	545	193	762
4	176	134	629	337	627	243	533	533	683	503	193	545
5	176	243	572	337	677	243	489	533	789	503	180	428
6	155	267	572	337	845	243	447	489	734	503	180	368
7	155	2,830	629	300	906	221	447	533	1,060	683	180	476
8	155	1,080	1,500	265	1,030	221	489	786	985	589	180	1,060
9	134	674	1,290	357	1,100	221	533	1,230	683	464	193	708
10	198	576	1,430	421	1,300	221	627	1,030	683	464	207	499
11	220	488	1,430	377	1,100	221	627	1,030	635	464	238	401
12	198	488	1,430	572	845	183	533	1,030	683	428	222	344
13	198	836	1,220	629	730	167	489	1,440	734	362	207	307
14	576	1,640	518	3,280	906	167	447	1,520	1,130	332	207	279
15	448	954	468	1,660	730	167	447	1,520	683	332	207	253
16	267	836	518	1,520	1,980	183	407	906	635	304	238	238
17	243	3,490	812	1,230	1,230	243	407	967	683	304	503	230
18	220	11,100	572	1,030	1,160	183	407	967	683	279	464	219
19	220	7,800	518	967	845	183	407	967	789	279	428	212
20	198	4,580	629	786	677	183	407	2,310	849	238	394	207
21	198	2,290	629	786	627	183	331	2,000	985	238	304	197
22	176	1,650	572	730	533	183	331	1,430	683	238	279	193
23	176	1,360	1,080	677	677	167	368	1,130	635	257	257	190
24	176	1,220	749	1,740	579	183	407	849	589	257	238	188
25	176	1,360	749	2,750	489	183	427	1,060	635	238	238	185
26	176	2,130	572	1,230	447	221	368	1,130	635	238	238	181
27	155	1,360	518	1,030	368	268	331	1,130	635	222	222	179
28	155	1,150	468	1,590	368	331	407	1,130	635	222	207	178
29	134	1,080	421	1,900	368	331	579	789	545	207	207	174
30	134	940	377	1,980	......	331	906	734	734	207	207	174
31	134	......	377	1,160	......	297	......	635	......	207	238	......
1912-13.												
1	180	344	......	......	510	279	......	......	1,880	1,360	284	144
2	238	304	......	......	464	279	......	......	2,050	915	277	148
3	213	318	......	......	464	294	......	......	1,880	789	261	225
4	394	332	......	......	435	347	......	......	1,670	762	246	1,880
5	304	612	......	......	411	401	......	......	1,240	1,020	219	2,990
6	289	......	......	......	388	464	......	......	1,170	1,020	210	849
7	286	......	464	......	356	......	......	......	1,430	985	208	520
8	284	......	468	......	329	......	......	......	1,550	789	220	390
9	284	1,630	464	......	304	347	......	......	1,060	789	210	318
10	282	1,390	......	......	292	......	......	......	882	915	201	279
11	279	......	......	......	275	......	......	......	915	734	193	242
12	275	......	......	......	264	......	......	......	1,020	635	188	227
13	255	......	......	......	257	......	......	......	1,200	950	185	210
14	238	......	589	......	......	......	......	......	1,090	915	183	200
15	228	......	476	......	......	......	......	......	849	789	188	194
16	244	789	511	......	1,840	......	......	......	882	635	180	184
17	460	......	683	......	......	......	......	......	819	683	185	178
18	442	......	......	......	......	......	......	......	849	734	196	178
19	503	2,450	......	......	......	......	......	......	1,200	762	185	196
20	......	1,550	......	......	......	......	1,090	......	1,320	762	179	183
21	......	950	394	......	......	......	1,360	......	1,130	734	168	201
22	......	1,090	......	......	520	......	532	......	1,200	708	158	428
23	......	985	......	......	435	......	341	......	1,510	612	157	318
24	......	849	......	......	394	......	289	......	1,280	545	156	238
25	......	......	......	......	368	......	289	......	1,430	468	155	214
26	......	......	......	1,320	353	......	432	......	1,320	394	152	199
27	......	......	......	915	329	......	503	......	1,090	341	152	192
28	460	......	......	......	299	......	......	1,240	950	347	148	203
29	439	......	......	......	......	......	......	1,130	882	408	146	200
30	464	372	......	......	......	......	......	1,240	1,200	335	144	192
31	404	......	......	......	......	......	......	1,510	......	284	144	......

Daily discharge, in second-feet, of North Fork of Snoqualmie River near North Bend, Wash., for the years ending Sept. 30, 1907–1915—Continued.

Day.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.
1913–14.												
1	184	321	955	524	729	1,800	513	1,060	955	603	118	62
2	183	277	698	470	686	1,340	558	1,200	890	569	116	66
3	200	219	580	470	569	1,060	799	1,260	806	552	110	61
4	199	237	470	524	603	988	1,090	1,060	632	481	108	61
5	197	729	418	1,300	615	858	1,340	890	574	428	103	59
6	193	1,520	444	3,300	586	792	1,020	825	519	378	98	59
7	589	858	444	3,100	502	812	890	890	508	344	100	59
8	589	729	368	2,090	470	955	890	890	1,600	330	103	62
9	635	825	321	1,450	449	922	955	890	1,450	312	103	106
10	1,020	1,060	277	1,160	460	806	1,020	1,060	1,090	308	98	126
11	4,700	668	277	1,090	546	735	988	1,060	922	295	90	103
12	2,350	524	393	1,020	569	792	988	988	922	295	84	113
13	2,260	418	321	922	621	988	988	1,160	858	295	79	118
14	1,760	344	344	818	615	1,760	1,490	1,300	806	295	81	116
15	1,380	321	470	792	609	1,490	1,680	1,160	890	326	84	465
16	1,260	2,180	344	858	609	1,880	1,450	955	922	308	88	552
17	890	1,450	257	799	609	1,490	1,160	825	858	265	98	513
18	858	1,020	219	....	592	1,300	1,120	799	773	245	100	686
19	955	792	185	....	626	1,230	1,520	735	674	226	100	825
20	858	760	154	....	710	1,200	1,450	825	603	219	84	988
21	729	609	140	....	890	1,090	1,090	955	704	208	70	890
22	638	638	140	....	1,260	1,020	890	955	735	188	68	546
23	580	1,020	126	....	1,120	988	858	922	574	169	68	449
24	552	1,920	113	735	1,160	922	773	799	644	160	66	378
25	524	1,200	100	....	1,060	858	686	858	922	157	66	223
26	470	1,060	100	....	858	825	704	858	735	154	64	249
27	524	1,060	88	....	1,640	812	812	818	662	146	66	470
28	444	825	113	615	1,340	704	799	812	662	137	68	359
29	368	922	169	....	....	650	741	680	621	132	68	286
30	321	955	237	....	....	586	806	650	603	126	70	245
31	277	....	418	656	....	563	....	806	....	124	66	....

Daily discharge, in second-feet, of North Fork of Snoqualmie River near North Bend, Wash., for the years ending Sept. 30, 1907–1915—Continued.

Day.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.
1914–15.												
1	223	470	601	833	493	388	1,810	401	704	274	178	81
2	408	825	541	833	582	388	3,660	405	641	256	171	79
3	524	2,400	531	641	502	388	2,900	474	598	242	164	78
4	378	1,500	493	556	461	456	2,110	456	541	229	158	78
5	321	1,700	448	488	488	526	1,460	456	502	222	153	78
6	273	1,820	422	448	592	536	1,140	465	493	216	148	81
7	249	1,220	401	426	566	465	1,070	488	465	209	142	86
8	223	860	376	448	521	456	965	493	409	209	128	89
9	205	800	352	521	531	434	764	516	380	204	124	123
10	378	770	340	587	561	426	715	635	364	199	120	150
11	1,400	1,900	321	758	493	413	674	652	356	194	117	128
12	892	1,460	310	801	465	405	833	571	344	194	115	102
13	1,180	1,780	292	669	448	413	1,070	516	333	396	112	102
14	680	1,220	281	630	413	764	898	521	314	608	109	104
15	460	965	285	603	392	1,480	715	483	296	479	106	108
16	403	782	267	571	372	1,000	758	456	296	521	104	119
17	932	686	260	516	405	833	801	448	296	630	102	106
18	1,420	608	260	483	692	833	776	536	310	502	100	98
19	1,640	806	253	502	502	727	758	663	352	438	98	95
20	1,340	1,820	253	526	439	613	727	710	526	374	95	91
21	922	1,260	242	516	422	715	603	603	443	310	93	88
22	674	965	253	470	401	898	531	582	372	288	89	82
23	546	930	232	413	388	1,000	502	561	325	266	89	79
24	449	833	226	392	380	930	483	587	310	244	88	79
25	413	776	236	376	470	745	474	727	288	222	86	78
26	388	1,040	239	356	443	619	483	782	396	216	84	78
27	326	833	267	356	405	526	479	1,270	413	209	82	78
28	303	782	376	348	388	526	488	1,880	372	200	79	74
29	273	721	344	340	......	776	483	1,260	337	190	78	73
30	303	661	372	348	......	865	456	965	303	187	74	71
31	492	......	828	356	......	745	......	795	......	178	78	......

NOTE.—Daily discharge determined as follows: 1907–8—July 4, 1907, to Sept. 30, 1908, from rating curve well defined between 100 and 3,000 second-feet; estimated by hydrographic comparison with records of South and Middle forks, as follows: Sept. 14–16, 1907, 473 second-feet; Nov. 27–30, 2,270 second-feet; Dec. 1–4, 2,270 second-feet; Dec. 6–10, 499 second-feet; interpolated for other days on which gage was not read,

1908–9—Oct. 1. 1908, to Sept. 30, 1909, from rating curve well defined between 100 and 3,000 second-feet. interpolated for days on which gage was not read.

1909–10—Oct. 1, 1909, to May 10, 1910, from rating curve well defined between 100 and 3,000 second-feet; May 11 to Sept. 30, 1910, from rating curve well defined between 50 and 500 second-feet. Not estimated Nov. 1–30, 1909, because of uncertainty as to the rating curve for flood stages.

1910–11—Oct. 1–3, 1910, from rating curve well defined between 50 and 500 second-feet; Oct. 4, 1910, to Sept. 30, 1911, from rating curve fairly well defined between 150 and 1,200 second-feet.

1911–12—Oct. 1 to Nov. 18, 1911, from rating curve fairly well defined between 150 and 1,200 second-feet; Nov. 19, 1911, to Jan. 14, 1912, rating curve not well defined; Jan. 15 to May 20, 1912, from rating curve well defined between 200 and 1,500 second-feet; May 21 to Sept. 30, 1912, from rating curve fairly well defined between 125 and 2,000 second-feet.

1912–13—Oct., 1912, to Sept. 30, 1913, from rating curve fairly well defined between 125 and 2,000 second-feet; estimated by hydrographic comparison with records of South and Middle forks as follows: Oct. 20–27, 1912, 529 second-feet; Nov. 6–8, 970 second-feet; Nov. 11–15, 1,470 second-feet; Nov. 17–18, 800 second-feet; Nov. 25–29, 501 second-feet; Feb. 14–15, 1913, 510 second-feet; Feb. 17–21, 1,160 second-feet; estimated, Sept. 7–8, by hydrographic comparison with record of North Fork of Snoqualmie River at cable bridge, as in table.

1913–14—Oct. 1–10, 1913, from rating curve fairly well defined between 125 and 2,000 second-feet; Oct. 11, 1913, to Sept. 30, 1914, from rating curve fairly well defined between 60 and 4,700 second-feet; estimated by hydrograpahic comparison with records of South and Middle forks, as follows: Jan. 18–23, 1914, 722 second-feet; Jan. 25–27, 698 second-feet; Jan. 29–30, 615 second-feet.

1914–15—Oct. 1 to Nov. 3, 1914, from rating curve fairly well defined between 60 and 4,700 second-feet; Nov. 4, 1914, to Sept. 30, 1915, from rating curve well defined between 80 and 2,500 second-feet; interpolated for lack of gage readings July 9–10, 19–20, 22–24, Aug. 2–3, 5–6, 9–10, and 13–14, 1915. Nov. 8–19, 1914, and Nov. 29 to Dec. 1, estimated by hydrographic comparison with records of North Fork of Snoqualmie River at cable bridge, as in table.

Monthly discharge of North Fork of Snoqualmie River near North Bend, Wash., for the years ending Sept. 30, 1907–1915.

[Drainage area, 102 square miles.]

Month.	Discharge in second-feet.				Run-off.		Accuracy.
	Maximum.	Minimum.	Mean.	Per square mile.	Depth in inches on drainage area.	Total in acre-feet.	
1907.							
July 21-31	183	153	167	1.64	0.67	3,640	C.
August	360	141	197	1.93	2.22	12,100	C.
September	....	....	320	3.14	3.50	19,000	C.
The period	....	....	....	....	....	34,700	
1907-8.							
October	271	147	189	1.85	2.13	11,600	C.
November	....	167	672	6.59	7.35	40,000	C.
December	....	....	770	7.55	8.70	47,300	C.
January	649	271	466	4.57	5.27	28,700	C.
February	555	223	353	3.46	3.73	20,300	C.
July	803	202	477	4.68	5.40	29,300	C.
August	298	141	174	1.71	1.97	10,700	C.
September	246	131	159	1.56	1.74	9,460	C.
1908-9.							
October	1,380	131	358	3.51	4.05	22,000	C.
November	3,180	183	664	6.51	7.26	39,500	C.
December	1,300	153	576	5.65	6.51	35,400	C.
January	2,900	328	917	8.99	10.36	56,400	C.
February	1,460	271	594	5.82	6.06	33,000	C.
March	555	328	420	4.12	4.75	25,800	C.
April	1,790	394	657	6.44	7.18	39,100	C.
May	1,880	601	959	9.40	10.84	59,000	C.
June	5,170	750	1,360	13.3	14.84	80,900	C.
July	1,300	271	527	5.17	5.96	32,400	C.
August	298	131	189	1.85	2.13	11,600	C.
September	555	131	229	2.25	2.51	13,600	C.
The year	5,170	131	619	6.07	82.45	449,000	
1909-10.							
October	699	223	373	3.66	4.22	22,900	C.
December	3,180	430	1,170	11.5	13.26	71,900	C.
January	3,080	328	773	7.58	8.74	47,500	C.
February	1,880	360	630	6.18	6.44	35,000	C.
March	3,470	803	1,640	16.1	18.56	101,000	C.
April	2,050	750	1,240	12.2	13.61	73,800	C.
May	3,970	693	1,170	11.5	13.26	71,900	D.
June	1,810	300	577	5.66	6.32	34,300	C.
July	300	126	202	1.98	2.28	12,400	C.
August	108	78	81.2	.796	.92	4,990	C.
September	300	56	82.8	.812	.91	4,930	C.
1910-11.							
October	3,310	292	973	9.54	11.00	59,800	C.
November	6,580	448	1,370	13.4	14.95	81,500	D.
December	2,200	346	713	6.99	8.06	43,800	C.
January	1,570	243	511	5.01	5.78	31,400	C.
February	318	176	242	2.37	2.47	13,400	C.
March	894	176	377	3.70	4.27	23,200	C.
April	726	292	438	4.29	4.79	26,100	C.
May	1,720	576	954	9.35	10.78	58,700	C.
June	1,640	411	769	7.54	8.41	45,800	C.
July	624	155	379	3.72	4.29	23,300	C.
August	176	83	111	1.09	1.26	6,820	C.
September	1,350	83	414	4.06	4.53	24,600	C.
The year	6,580	83	605	5.93	80.59	438,000	

Monthly discharge of North Fork of Snoqualmie River near North Bend, Wash., for the years ending Sept. 30, 1907–1915—Continued.

Month.	Discharge in second-feet.				Run-off.		Accuracy.
	Maximum.	Minimum.	Mean.	Per square mile.	Depth in inches on drainage area.	Total in acre-feet.	
1911–12.							
October	576	134	203	1.99	2.29	12,500	C.
November	11,100	134	1,770	17.4	19.41	105,000	D.
December	1,500	377	760	7.45	8.59	46,700	D.
January	3,280	265	1,000	9.80	11.30	61,500	D.
February	1,980	368	823	8.07	8.70	47,300	C.
March	331	167	223	2.19	2.52	13,700	C.
April	906	331	466	4.57	5.10	27,700	C.
May	2,310	489	1,020	10.00	11.53	62,700	C.
June	1,130	545	734	7.20	8.03	43,700	C.
July	789	207	374	3.67	4.23	23,000	C.
August	503	180	247	2.42	2.79	15,200	C.
September	1,840	174	407	3.99	4.45	24,200	B.
The year	11,100	134	667	6.54	88.94	484,000	
1912–13.							
October	....	180	377	3.70	4.27	23,200	C.
November	....	304	944	9.25	10.32	56,200	D.
February	....	257	575	5.64	5.87	31,900	C.
June	2,050	819	1,230	12.1	13.50	73,200	B.
July	1,360	284	714	7.00	8.07	43,900	B.
August	284	144	189	1.85	2.13	11,600	B.
September	2,990	144	404	3.96	4.42	24,000	B.
1913–14.							
October	4,700	183	861	8.44	9.73	52,900	B.
November	2,180	219	849	8.32	9.28	50,500	B.
December	955	88	312	3.06	3.53	19,200	B.
January	3,300	470	979	9.60	11.07	60,200	B.
February	1,640	449	754	7.39	7.70	41,900	B.
March	1,880	563	1,040	10.2	11.76	64,000	B.
April	1,680	513	1,000	9.80	10.93	59,500	B.
May	1,300	650	934	9.16	10.56	57,400	B.
June	1,600	508	804	7.88	8.79	47,800	B.
July	603	124	283	2.77	3.19	17,400	B.
August	118	64	86.6	.849	.98	5,320	B.
September	988	59	310	3.04	3.39	18,400	B.
The year	4,700	59	683	6.70	90.91	495,000	
1914–15.							
October	1,640	205	601	5.89	6.79	37,000	B.
November	2,400	470	1,110	10.9	12.16	66,000	B.
December	823	226	352	3.45	3.98	21,600	A.
January	833	340	520	5.10	5.88	32,000	A.
February	692	372	472	4.63	4.82	26,200	A.
March	1,480	388	655	6.42	7.40	40,300	A.
April	3,660	456	986	9.67	10.79	58,700	B.
May	1,880	401	657	6.44	7.42	40,400	A.
June	704	288	403	3.95	4.41	24,000	A.
July	630	178	294	2.88	3.32	18,100	B.
August	178	74	112	1.10	1.27	6,890	B.
September	150	71	91.9	.901	1.01	5,470	B.
The year	3 660	71	520	5.10	69.25	377,000	

SOUTH FORK OF SNOQUALMIE RIVER NEAR GARCIA, WASH.

Location.—In the SW. ¼ sec. 6, T. 22 N., R. 10 E., at Bide-a-wee ranch, 150 feet below Alice Creek, a quarter of a mile above Fifteenmile bridge, 1¼ miles southeast of Garcia, in King County.

Drainage area.—45 square miles (measured on topographic map).

Records available.—August 4, 1910, to October 15, 1915, when station was discontinued.

Gage.—Friez water-stage recorder on left bank, 150 feet below mouth of Alice Creek, installed November 6, 1913. Original gage vertical staff on right bank opposite present gage, read to tenths daily by C. P. Beard. Datum of original gage 1.54 feet lower than present datum.

Discharge measurements.—Made from footbridge or by wading.

Channel and control.—Channel at gage composed of gravel and sand. Control composed of boulders and gravel, shifting at high stages. Zero flow would occur at gage height 2.1 feet, as measured September 22, 1910, and at 0.1 foot, new datum, as measured August 29, 1914.

Extremes of discharge.—Maximum stage during year from water-stage recorder, 4.7 feet at 1 a. m. April 2 (discharge, 3,020 second-feet); minimum stage from recorder, 0.68 foot September 5 and 6 (discharge, 28 second-feet).

1910–1915: Maximum stage recorded, 9.6 feet November 19, 1911 (discharge, 4,370 second-feet). High-water mark of this flood found by leveling to be about 11.5 feet. Minimum stage recorded, 2.3 feet in August and September, 1910, and September, 1911 (discharge, 21 second-feet).

Winter flow.—Stage-discharge relation not affected by ice.

Diversions.—None.

Regulation.—None.

Accuracy.—Rating curves well defined for low stages; extensions for high water uncertain. Results prior to November, 1913, fair except for periods when observer's record is apparently in error; results for remainder of period excellent for low stages and good for medium stages.

Cooperation.—Gage-height record and some discharge measurements furnished by the Puget Sound Traction, Light & Power Co.

Discharge measurements of South Fork of Snoqualmie River near Garcia, Wash., during 1910–1915.

Date.	Made by—	Gage height.	Discharge.	Date.	Made by—	Gage height.	Discharge.
		Feet.	*Sec.-ft.*			*Feet.*	*Sec.-ft.*
1910.				1914.			
Aug. 12	Crawford and Easter	2.44	40.1	May 29	Weller Rose [a]	1.49	293
				Aug. 14	do [b]	.73	40.9
1911.				29	I. L. Collier [c]	.68	33.2
Apr. 19	M. T. Crawford	3.06	236				
June 4	R. R. Easter	3.48	447	1915.			
Aug. 26	M. T. Crawford	2.39	35.9	Mar. 20	Hartson and McFadden	1.48	270
Sept. 22	G. L. Parker	2.95	185	July 30	do	.90	64
				Sept. 6	R. C. McFadden	.70	30.1
1912.							
May 13	H. C. Hanson	4.26	1,110				
1913.							
July 25	Tuttle and Rose	2.95	201				
Sept. 16	G. L. Parker	2.45	55				

[a] This measurement and all following referred to new gage. Old gage read 3.03 feet.
[b] Old gage read 2.27 feet.
[c] Old gage read 2.22 feet.

Daily discharge, in second-feet, of South Fork of Snoqualmie River near Garcia, Wash. from Aug. 4, 1910, to Oct. 15, 1915.

Day.	Aug.	Sept.	Day.	Aug.	Sept.	Day.	Aug.	Sept.
1910.			1910.			1910.		
1		21	11	36	36	21	36	36
2		21	12	36	21	22	36	36
3		21	13	36	21	23	36	36
4	54	21	14	36	21	24	36	21
5	54	21	15	54	21	25	36	21
6	54	36	16	36	21	26	21	21
7	36	36	17	36	36	27	21	21
8	36	21	18	36	36	28	21	21
9	36	21	19	36	21	29	36	102
10	36	36	20	36	21	30	36	76
						31	36	

Daily discharge, in second-feet, of South Fork of Snoqualmie River near Garcia, Wash., from Aug. 4, 1910, to Oct. 15, 1915—Continued.

Day.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.
1910-11.												
1	300	208	168	168	102	54	350	518	1,060	168	54	36
2	402	208	168	168	76	54	350	582	582	208	54	36
3	2,770	402	168	168	76	54	300	650	582	300	54	21
4	2,120	300	133	208	76	54	252	885	458	252	54	21
5	885	300	102	208	76	76	208	970	402	208	54	36
6	650	350	133	350	76	76	168	582	402	252	54	133
7	1,580	402	133	1,060	76	76	168	402	458	168	54	133
8	582	350	133	458	76	76	133	518	518	168	54	76
9	402	402	168	402	76	76	133	458	458	168	36	76
10	300	2,030	168	252	76	76	168	402	650	168	36	102
11	168	1,850	168	208	76	54	168	350	970	168	36	76
12	133	1,240	133	208	76	54	208	350	805	168	36	102
13	102	725	133	168	76	54	208	402	458	168	36	252
14	76	208	133	168	76	54	168	350	438	133	36	168
15	54	208	133	168	76	76	168	350	418	133	36	168
16	36	208	102	133	76	76	168	725	399	133	36	650
17	650	208	102	133	76	76	168	725	379	102	36	402
18	970	252	102	133	76	133	208	970	359	102	36	252
19	402	252	133	168	76	133	234	725	340	102	36	168
20	300	402	133	168	76	133	252	650	320	102	54	168
21	208	3,770	102	168	76	133	300	582	300	102	36	133
22	168	2,030	208	168	54	133	300	458	300	102	36	188
23	208	1,060	208	133	54	168	350	458	252	76	36	133
24	252	650	402	133	54	168	518	402	252	76	36	133
25	970	350	252	133	54	168	805	402	208	76	36	102
26	402	300	252	133	54	133	402	350	252	76	34	102
27	300	252	252	102	54	133	350	458	350	76	36	102
28	252	208	208	133	54	133	350	582	300	76	36	102
29	208	208	208	133	......	168	350	725	208	54	36	76
30	168	168	208	102	......	252	458	805	252	54	36	76
31	133	......	168	133	......	350	......	885	......	54	36	......
1911-12.												
1	76	54	504	64	440	45	115	440	572	225	54	249
2	54	54	380	64	273	45	147	273	504	183	45	183
3	54	54	273	64	147	30	273	273	440	183	54	147
4	54	76	183	45	115	30	325	273	440	183	54	131
5	54	133	273	45	115	30	225	325	572	147	54	115
6	54	208	325	45	88	30	225	440	504	115	45	115
7	54	885	380	45	64	30	225	800	720	147	45	183
8	54	582	504	45	88	30	273	885	720	147	45	225
9	54	300	504	64	147	30	325	800	644	147	64	147
10	102	252	440	76	504	30	504	720	504	115	64	147
11	76	168	440	64	572	30	380	720	504	115	54	115
12	76	133	380	88	225	45	380	1,320	572	115	45	115
13	76	133	325	504	225	45	273	1,230	380	115	45	88
14	133	582	273	970	325	45	225	1,060	504	131	45	88
15	168	458	225	504	440	64	273	644	225	115	64	88
16	102	650	225	225	885	88	273	644	325	115	147	76
17	102	2,670	225	183	1,140	115	325	644	440	115	273	76
18	76	3,970	183	147	720	147	273	720	440	88	115	64
19	76	4,370	183	147	225	147	225	1,060	504	88	88	64
20	76	2,920	147	115	147	88	225	1,320	572	88	76	64
21	76	2,720	147	115	115	64	183	1,230	440	88	76	64
22	76	644	147	115	88	64	183	440	273	88	64	54
23	54	440	115	88	88	64	225	504	273	88	54	54
24	54	380	115	115	64	64	225	504	380	64	54	54
25	76	644	88	504	64	64	183	800	380	88	54	54
26	76	970	88	147	64	64	183	885	325	64	45	54
27	54	720	88	380	45	64	183	885	273	64	45	54
28	54	644	88	572	45	88	225	720	183	64	45	45
29	54	644	64	1,060	45	115	440	644	165	54	64	45
30	54	572	64	1,320	......	115	440	440	225	54	88	45
31	54	......	64	720	......	115	......	440	......	54	225	......

Daily discharge, in second-feet, of South Fork of Snoqualmie River near Garcia, Wash., from Aug. 4, 1910, to Oct. 15, 1915—Continued.

Day.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.
1912–13.												
1	64	131	165	842	183	64	225	225	1,320	440	115	38
2	54	131	225	1,320	183	64	147	225	1,230	440	102	88
3	54	115	800	2,220	183	76	115	183	1,140	380	102	504
4	102	147	440	970	147	88	88	183	1,140	440	102	225
5	76	225	325	720	147	88	76	225	885	504	88	131
6	64	273	225	440	88	88	64	504	800	440	88	88
7	54	273	204	225	76	88	64	720	1,060	380	76	88
8	165	380	183	183	64	88	64	800	....	325	102	76
9	131	572	183	165	64	88	76	885	....	325	76	76
10	115	572	183	165	64	88	88	800	....	225	76	76
11	88	572	165	165	54	76	147	800	....	147	64	64
12	88	720	131	147	54	76	325	720	....	115	64	64
13	76	1,140	88	147	54	64	325	572	....	325	64	54
14	64	504	64	147	88	54	440	504	....	325	76	54
15	64	380	64	147	440	54	325	440	504	273	88	54
16	88	273	64	147	1,320	64	225	440	504	299	102	54
17	249	225	88	147	1,950	88	147	440	504	225	102	54
18	131	885	115	115	970	225	225	440	572	273	88	54
19	183	1,320	147	88	720	147	380	440	720	299	76	54
20	147	800	147	76	504	88	885	504	644	299	64	45
21	115	380	147	45	325	76	720	504	572	299	64	64
22	147	352	147	54	225	64	644	1,060	644	273	64	147
23	147	325	154	64	183	64	572	1,230	800	273	54	102
24	165	325	154	225	147	64	504	1,230	800	204	54	102
25	225	273	154	720	115	54	440	1,230	644	176	45	64
26	147	225	154	440	88	45	600	1,230	644	147	45	54
27	147	204	131	380	76	64	273	1,320	572	147	45	54
28	147	183	115	273	76	64	273	885	572	131	45	54
29	147	183	147	225	....	225	273	800	440	131	45	54
30	131	183	225	225	....	380	225	885	504	115	38	54
31	131	....	325	225	....	504	....	970	....	115	33	....
1913–14.												
1	49	130	331	93	203	443	179	617	617	226	55	32
2	45	114	283	93	163	336	203	896	564	212	55	31
3	45	114	244	104	152	293	278	922	437	203	55	31
4	54	114	221	273	163	273	499	590	326	179	51	30
5	45	166	203	1,920	146	234	703	492	288	152	50	30
6	54	395	187	2,260	128	221	506	506	248	146	51	31
7	88	309	179	2,090	113	244	480	570	248	142	51	31
8	147	263	163	930	107	288	512	538	437	132	50	36
9	165	283	152	570	101	293	564	538	377	128	47	55
10	1,590	342	142	419	96	273	617	590	331	122	47	42
11	2,720	273	142	336	93	258	525	603	342	116	45	40
12	964	234	142	293	93	268	480	710	365	119	45	47
13	1,050	212	142	258	98	342	788	930	353	116	43	42
14	650	195	149	239	101	696	820	1,180	383	107	42	69
15	650	187	163	226	98	733	1,270	983	437	122	40	125
16	448	659	149	226	93	896	710	703	425	104	40	104
17	386	449	142	212	90	740	499	596	383	96	40	101
18	448	336	135	195	88	688	473	558	326	90	39	142
19	417	314	128	175	90	645	772	538	273	86	37	122
20	386	283	122	163	98	631	710	631	253	86	37	183
21	330	244	116	160	146	590	461	718	278	78	37	167
22	278	234	113	216	258	506	383	703	253	78	37	110
23	254	314	110	175	258	443	359	638	216	76	37	86
24	386	486	104	160	314	395	342	518	298	73	36	73
25	254	389	101	149	268	348	342	480	331	69	36	63
26	230	365	101	149	234	298	383	437	268	67	35	63
27	230	377	98	138	570	258	437	377	248	65	36	73
28	186	331	96	132	413	226	371	331	230	63	36	65
29	147	353	93	135	....	216	342	320	230	61	36	57
30	147	353	90	171	....	203	407	371	226	59	35	55
31	130	....	90	195	....	195	....	499	....	57	33	....

Daily discharge, in second-feet, of South Fork of Snoqualmie River near Garcia, Wash., from Aug. 4, 1910, to Oct. 15, 1915—Continued.

Day.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.
1914-15.													
1	55	314	197	92	63	100	1,820	161	197	65	61	33	59
2	156	1,410	180	87	59	97	2,480	147	177	59	59	33	1,060
3	146	1,900	165	79	59	97	1,930	161	161	53	57	30	829
4	116	1,150	165	72	63	137	1,070	161	150	51	53	29	262
5	98	1,150	154	70	70	137	704	184	150	49	51	28	169
6	83	845	140	65	84	124	580	214	140	51	47	28	127
7	78	601	134	63	79	124	616	227	130	53	45	30	103
8	69	498	124	65	82	124	492	210	117	53	44	72	95
9	65	498	117	65	97	127	386	222	109	53	44	111	87
10	181	392	111	65	103	184	369	222	109	51	42	57	92
11	334	1,170	106	67	100	140	404	184	100	47	42	45	82
12	309	726	97	67	97	130	472	169	95	47	40	40	167
13	244	704	95	65	92	130	498	154	92	74	39	40	264
14	183	492	89	63	82	299	369	150	87	103	40	42	568
15	146	369	89	61	77	609	351	137	84	103	40	44	312
16	138	307	84	59	74	410	435	124	82	150	40	40	....
17	273	270	79	59	82	334	492	143	82	227	42	36	....
18	544	241	70	57	95	375	479	165	77	150	39	33	....
19	772	246	65	55	82	296	441	184	84	114	38	32	....
20	480	623	63	55	79	280	380	184	111	95	36	32	....
21	326	472	63	51	89	375	280	154	92	84	36	30	....
22	253	351	63	47	89	525	241	147	82	77	34	30	....
23	212	363	63	44	89	601	222	140	74	70	33	30	....
24	191	346	59	44	100	479	222	177	72	65	32	30	....
25	175	318	57	44	127	340	236	184	65	61	32	30	....
26	152	369	55	44	111	275	236	188	89	61	30	30	....
27	142	323	57	42	103	251	227	398	97	63	30	33	....
28	128	280	67	42	100	265	227	674	84	63	29	32	....
29	119	246	61	44	100	340	236	351	74	63	29	30	....
30	149	214	65	44	......	357	184	260	70	65	29	32	....
31	175	....	92	47	......	296	....	218	......	63	32	......	....

NOTE.—Discharge ascertained from rating curves as follows: Aug. 4, 1910, to Nov. 19, 1911, well defined below 700 second-feet; Nov. 20, 1911, to Oct. 11, 1913, well defined below 1,500 second-feet; Oct. 12 to Nov. 5, 1913, well defined below 400 second-feet; Nov. 6, 1913, to Nov. 2, 1914, and Nov. 3, 1914, to Oct. 15, 1913, well defined below 350 second-feet. Many gage heights prior to November, 1913, corrected for apparent errors in reading gage after hydrographic comparison with records of North, Middle, and South forks of Snoqualmie River near North Bend. Gage readings June 14–20, 1911, probably erroneous; discharge interpolated. June 8–14, 1913, no record; discharge estimated from hydrograph at 613 second-feet.

Monthly discharge of South Fork of Snoqualmie River near Garcia, Wash., for the years ending Sept. 30, 1910–1915.

[Drainage area, 45 square miles.]

Month.	Discharge in second-feet.				Run-off.		Accuracy.
	Maximum.	Minimum.	Mean.	Per square mile.	Depth in inches on drainage area.	Total in acre-feet.	
1910.							
August 4–31	54	21	37.0	0.822	0.86	2,050	C.
September	102	21	30.0	.667	.74	1,790	C.
The period	....	....	....	....	....	3,840	
1910–11.							
October	2,770	36	521	11.6	13.37	32,000	D.
November	3,770	168	650	14.4	16.07	38,700	D.
December	402	102	168	3.73	4.30	10,300	C.
January	1,060	102	212	4.71	5.43	13,000	C.
February	102	54	71.4	1.59	1.66	3,970	C.
March	350	54	111	2.47	2.85	6,820	C.
April	805	133	279	6.20	6.92	16,600	D.
May	970	350	570	12.7	14.64	35,000	D.
June	1,060	208	438	9.73	10.86	26,100	D.
July	300	54	135	3.00	3.46	8,300	C.
August	54	36	41.2	.916	1.06	2,530	C.
September	650	21	141	3.13	3.49	8,390	D.
The year	3,770	21	279	6.20	84.11	202,000	
1911–12.							
October	168	54	72.7	1.62	1.87	4,470	C.
November	4,370	54	901	20.0	22.31	53,600	D.
December	504	64	240	5.33	6.14	14,800	C.
January	1,320	45	279	6.20	7.15	17,200	C.
February	1,140	45	259	5.76	6.21	14,900	C.
March	147	30	65.3	1.45	1.67	4,020	C.
April	504	115	265	5.89	6.57	15,800	D.
May	1,320	273	712	15.8	18.22	43,800	D.
June	720	165	433	9.62	10.73	25,800	D.
July	225	54	111	2.47	2.85	6,820	C.
August	273	45	73.9	1.64	1.89	4,540	C.
September	249	45	100	2.22	2.48	5,950	C.
The year	4,370	30	291	6.47	88.09	212,000	
1912–13.							
October	249	54	120	2.67	3.08	7,380	C.
November	1,320	115	409	9.09	10.14	24,300	C.
December	800	64	189	4.20	4.84	11,600	C.
January	2,220	45	369	8.20	9.45	22,700	C.
February	1,950	54	307	6.82	7.10	17,000	C.
March	504	45	108	2.40	2.77	6,640	C.
April	885	64	298	6.62	7.39	17,700	C.
May	1,320	183	690	15.3	17.64	42,400	D.
June	....	440	717	15.9	17.74	42,700	D.
July	504	115	274	6.09	7.02	16,800	D.
August	115	33	72.5	1.61	1.86	4,460	C.
September	504	38	89.7	1.99	2.22	5,340	C.
The year	2,200	33	303	6.73	91.25	219,000	
1913–14.							
October	2,720	45	418	9.29	10.71	25,700	C.
November	659	114	294	6.53	7.29	17,500	A.
December	331	90	149	3.31	3.82	9,160	A.
January	2,260	93	415	9.22	10.63	25,500	B.
February	570	88	171	3.80	3.96	9,500	A.
March	896	195	402	8.93	10.30	24,700	B.
April	1,270	179	514	11.4	12.72	30,600	B.
May	1,180	320	616	13.7	15.79	37,900	B.
June	617	216	333	7.40	8.26	19,800	A.
July	226	57	111	2.47	2.85	6,820	A.
August	55	33	42.4	.942	1.09	2,610	A.
September	183	30	71.2	1.58	1.76	4,240	A.
The year	2,720	30	296	6.58	89.18	214,000	

Monthly discharge of South Fork of Snoqualmie River near Garcia, Wash., for the years ending Sept. 30, 1910–1915—Continued.

Month.	Discharge in second-feet.				Run-off.		Accuracy.
	Maximum.	Minimum.	Mean.	Per square mile.	Depth in inches on drainage area.	Total in acre-feet.	
1914–15.							
October	772	55	209	4.64	5.35	12,900	A.
November	1,900	214	573	12.7	14.17	34,100	B.
December	197	55	97.6	2.17	2.50	6,000	A.
January	92	42	58.8	1.31	1.51	3,620	A.
February	127	59	90.2	2.00	2.08	5,010	A.
March	609	97	268	5.96	6.87	16,500	A.
April	2,480	184	553	12.3	13.72	32,900	B.
May	674	124	206	4.58	5.28	12,700	A.
June	197	70	104	2.31	2.58	6,190	A.
July	227	47	76.9	1.71	1.97	4,730	A.
August	61	29	40.2	.893	1.03	2,470	A.
September	111	28	38.1	.847	.94	2,270	A.
The year	2,480	28	192	4.27	58.00	139,000	

NOTE.—Oct. 1–15, 1915, mean discharge, 286 second-feet; total run-off, 8,510 acre-feet.

SOUTH FORK OF SNOQUALMIE RIVER AT NORTH BEND, WASH.

LOCATION.—In the NW. ¼ sec. 9, T. 23 N., R. 8 E., at Northern Pacific Railway bridge at North Bend, in King County, 2½ miles above mouth.

DRAINAGE AREA.—84 square miles (measured on topographic map).

RECORDS AVAILABLE.—July 21, 1907, to February 29, 1908, and June 26, 1908, to September 30, 1915.

GAGE.—Fuller water-stage recorder on right end of bridge, installed September 1, 1912. Vertical staff installed July 6, 1907, at same location and datum, read to half-tenths every second day from July 21, 1907, to February 29, 1908, and daily from June 26, 1908, to October 30, 1910, by Charles Rachor, and daily to half-tenths from November 1, 1910, to August 31, 1912, by Mrs. Alice Rachor.

DISCHARGE MEASUREMENTS.—By wading or from cable installed 600 feet below bridge March 17, 1911; prior to that date from bridge.

CHANNEL AND CONTROL.—Channel composed of small gravel; shifting at high stages. Stage of zero flow, gage height —0.7 foot, as measured September 11, 1911, —0.2 foot, August 18, 1914, and at —0.1 foot September 2, 1915.

EXTREMES OF DISCHARGE.—Maximum stage during year, from water-stage recorder, 4.8 feet at 7 a. m. November 3 (discharge, 2,670 second-feet); minimum stage, from recorder, 0.66 foot at 8 p. m. September 30 (discharge, 73 second-feet).

1907–1915: Maximum stage recorded, "Water over gage" November 3, 4, 19, 23, and 29, 1909 (gage height and discharge not determined); minimum stage recorded, 0.70 foot October 10, 11, 1908 (discharge, 68 second-feet).

WINTER FLOW.—Stage-discharge relation not affected by ice.

DIVERSIONS.—None.

REGULATION.—None.

ACCURACY.—Gage-height record prior to November, 1910, not very reliable; results for that period only fair. Record November, 1910, to August, 1912, reliable. For remainder of period results excellent except October, 1912, to May, 1913, when recorder was not working properly, and August to October, 1914, when stage-discharge relation was affected by backwater from temporary dam and from débris.

COOPERATION.—Gage-height record and some discharge measurements furnished by the Puget Sound Traction, Light & Power Co.

Discharge measurements of South Fork of Snoqualmie River at North Bend, Wash., during 1907–1915.

Date.	Made by—	Gage height.	Discharge.
1907.		*Feet.*	*Sec.-ft.*
July 6	A. S. Kalenborn	1.63	343
Aug. 8	Baum and Kalenborn	1.13	166
Oct. 29	A. S. Kalenborn	.93	101
1908.			
Sept. 24	M. T. Crawford	.75	76
1909.			
Aug. 26	M. T. Crawford	.98	135
1910.			
Mar. 17	A. T. Harris	3.80	1,570
Aug. 25	Crawford and Easter	.30	79
1911.			
Mar. 17	R. R. Easter	1.75	371
June 7	Crawford and Easter	2.23	582
Sept. 11	G. L. Parker	.83	156
Oct. 10	R. R. Easter	.80	151
1912.			
Jan. 11	Weller Rose	1.45	268
Feb. 21	....do	1.90	602
Mar. 30	....do	1.55	392
Apr. 25	....do	1.50	371
May 10	Pierce and Hanson	2.40	901
July 29	Weller Rose	.90	144

Date.	Made by—	Gage height.	Discharge.
1913.		*Feet.*	*Sec.-ft.*
Jan. 28	L. M. Severtson	1.90	620
June 4	J. G. Eernisse	3.07	1,310
July 22	Tuttle and Rose	1.40	380
22	G. L. Parker	1.40	370
Aug. 17	J. T. Hartson	.78	154
Sept. 15	Weller Rose	.74	137
Oct. 11	....do	4.20	2,260
1914.			
May 7	Rose and Kurtz	2.08	685
Aug. 18	Collier and Rose	.81	100
1915.			
Jan. 13	Brown and McFadden	1.36	336
13	McFadden and Brown	1.36	346
Mar. 18	McFadden and Hartson	1.83	595
Apr. 3	R. C. McFadden	4.39	2,230
July 7	McFadden and Wiswell	.99	151
10	R. C. McFadden	.97	156
Aug. 2	Hartson and McFadden	.90	139
Sept. 2	R. C. McFadden	.77	98

Daily discharge in second-feet, of South Fork of Snoqualmie River at North Bend, Wash., for the years ending Sept. 30, 1907–1915.

Day.	July.	Aug.	Sept.	Day.	July.	Aug.	Sept.	Day.	July.	Aug.	Sept.
1907.				1907.				1907.			
1	......	140	128	11	......	140	152	21	166	140	212
2	......	128	154	12	......	128	152	22	159	152	182
3	......	128	180	13	......	208	152	23	152	152	152
4	......	128	154	14	......	288	210	24	152	152	152
5	......	128	128	15	......	268	265	25	152	182	152
6	352	128	128	16	......	248	320	26	152	212	140
7	......	144	128	17	......	239	374	27	152	212	128
8	......	160	128	18	......	230	330	28	152	212	128
9	......	156	128	19	......	179	212	29	152	170	128
10	......	152	140	20	......	128	212	30	152	128	128
								31	152	128	......

Daily discharge, in second-feet, of South Fork of Snoqualmie River at North Bend, Wash., for the years ending Sept. 30, 1907–1915—Continued.

Day.	Oct.	Nov.	Dec.	Jan.	Feb.	June.	July.	Aug.	Sept.
1907–8.									
1	128	214	....	430	204	....	890	212	140
2	128	288	....	418	196	....	775	212	140
3	128	309	....	396	188	....	830	212	140
4	128	330	....	374	180	....	665	212	128
5	128	330	374	419	224	....	638	196	128
6	128	330	352	464	268	....	585	196	128
7	128	320	330	487	268	....	610	196	128
8	128	309	289	510	268	....	610	180	128
9	128	309	248	487	258	....	560	180	128
10	122	309	333	464	248	....	560	180	128
11	117	309	418	452	230	....	510	180	117
12	117	309	514	441	212	....	560	166	117
13	117	244	610	408	212	....	585	166	117
14	117	180	548	374	212	....	510	166	114
15	117	188	487	352	250	....	560	166	110
16	117	196	420	330	288	....	638	166	106
17	117	222	352	330	388	....	560	140	103
18	116	248	310	330	487	....	464	140	99
19	115	289	268	363	420	....	441	140	95
20	116	330	299	396	352	....	418	128	92
21	117	352	330	374	320	....	418	128	88
22	117	374	498	352	288	....	396	128	84
23	117	374	665	320	278	....	374	128	81
24	116	374	902	288	268	....	374	117	77
25	115	374	1,140	268	354	....	330	117	82
26	115	374	985	248	441	775	309	117	87
27	115	....	830	239	513	775	288	128	92
28	114	....	708	230	585	665	268	180	97
29	113	....	585	221	418	610	248	288	102
30	140	....	513	212	....	665	230	196	107
31	140	....	441	212	....	....	212	152	....

Day.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.
1908–9.												
1	112	1,420	309	418	309	418	464	665	1,960	487	152	86
2	117	830	288	418	309	396	464	638	1,490	464	140	86
3	128	720	288	950	330	418	441	1,010	1,210	487	140	86
4	117	638	268	775	330	418	374	1,210	1,070	510	140	86
5	117	610	248	610	330	374	352	830	950	487	128	77
6	96	585	248	487	330	330	330	720	890	374	128	77
7	86	464	230	441	309	352	330	585	890	464	117	77
8	77	418	230	418	288	374	352	560	830	396	117	77
9	77	374	248	374	288	374	418	665	1,210	374	117	77
10	68	330	....	352	288	352	510	638	950	374	106	86
11	68	288	....	330	268	352	464	610	950	535	106	86
12	77	248	585	309	248	352	418	560	950	418	106	77
13	106	212	720	288	248	330	510	535	720	330	106	77
14	248	180	510	268	248	330	510	510	720	330	106	77
15	268	152	418	288	330	330	464	510	830	309	106	77
16	309	212	374	288	510	330	441	510	720	309	106	77
17	288	418	330	487	950	396	418	560	720	288	96	77
18	268	1,350	309	585	890	374	396	560	665	268	96	77
19	268	720	288	1,140	720	374	374	585	665	248	96	77
20	309	585	268	1,210	585	374	374	535	638	230	96	374
21	248	665	248	950	510	374	396	487	638	212	96	830
22	230	775	248	775	464	352	396	487	610	212	96	330
23	212	720	248	610	441	352	396	510	560	196	86	248
24	212	560	309	510	464	330	374	610	510	196	86	196
25	196	464	510	464	487	352	950	720	487	180	86	180
26	196	418	560	441	464	396	830	950	487	180	124	166
27	230	396	950	418	464	418	775	1,210	487	166	115	140
28	230	374	1,070	396	441	418	665	950	464	166	106	128
29	248	352	720	374	....	464	560	830	464	166	106	196
30	665	309	585	352	....	441	510	890	487	152	96	248
31	950	....	510	330	....	487	....	1,210	....	152	86	....

Daily discharge, in second-feet, of South Fork of Snoqualmie River at North Bend, Wash., for the years ending Sept. 30, 1907–1915—Continued.

Day.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.
1909–10.												
1	196	....	1,730	209	515	2,290	492	426	515	169	95	79
2	180	....	960	198	386	2,710	492	406	426	160	95	79
3	180	....	670	188	350	2,290	470	426	318	160	95	79
4	180	....	565	178	304	1,490	426	470	290	160	95	79
5	180	....	515	169	290	1,280	426	448	318	152	89	79
6	212	....	426	169	278	780	515	470	350	152	89	79
7	212	....	386	178	266	780	540	670	290	144	89	79
8	212	....	350	178	242	615	615	725	266	144	89	79
9	212	....	334	169	231	565	670	780	266	144	89	79
10	212	....	318	160	220	515	590	1,350	290	144	89	79
11	196	....	368	152	209	615	590	1,730	426	144	89	79
12	180	....	1,730	152	188	840	670	1,020	386	144	89	75
13	180	....	1,280	152	209	1,080	615	725	290	144	84	75
14	180	....	780	144	198	1,350	565	670	304	136	84	75
15	166	....	615	144	188	1,420	492	565	266	136	84	75
16	152	......	540	152	178	1,280	492	565	254	128	84	71
17	152	....	448	152	178	1,570	470	515	231	128	84	71
18	140	....	368	350	178	1,650	670	670	220	121	84	71
19	152	....	350	242	169	1,810	1,020	515	220	114	84	71
20	152	....	318	198	169	1,570	1,020	470	231	114	79	71
21	166	....	290	209	160	1,420	960	426	231	108	79	71
22	166	....	266	642	152	1,210	725	470	209	108	79	71
23	166	....	242	1,020	144	1,020	900	492	209	114	79	71
24	180	....	242	1,210	198	900	1,420	642	198	101	79	71
25	180	....	242	670	266	642	1,570	515	198	101	79	71
26	180	....	231	540	515	565	1,490	492	209	101	79	71
27	196	....	220	470	780	515	900	426	198	101	79	71
28	196	....	290	386	900	492	670	386	178	101	79	71
29	212	....	198	350	....	448	565	426	160	101	79	75
30	212	....	242	840	....	406	470	470	160	101	79	136
31	230	....	220	615	....	515	....	515	....	101	79	......
1910–11.												
1	160	220	426	426	304	178	406	615	1,080	304	121	89
2	304	242	470	386	266	178	406	670	900	290	114	89
3	2,890	470	470	350	242	169	426	780	670	318	114	89
4	1,350	266	492	386	242	178	386	1,020	565	318	108	101
5	840	242	565	426	231	198	334	960	470	304	108	101
6	670	670	590	470	220	198	318	725	515	304	114	128
7	1,570	840	615	1,140	220	231	290	725	590	318	114	160
8	1,350	1,140	492	840	220	242	290	670	515	304	114	136
9	492	725	590	725	220	242	350	615	565	266	114	178
10	426	3,160	540	565	220	242	386	590	615	242	114	152
11	318	2,370	470	470	220	242	350	565	960	242	108	144
12	278	1,080	406	426	220	220	318	515	960	220	108	152
13	231	780	386	386	220	209	290	615	840	220	101	386
14	198	565	350	350	220	220	266	590	670	220	101	290
15	198	492	334	318	209	242	266	565	670	220	101	386
16	178	406	318	318	198	318	290	565	590	220	101	960
17	780	350	290	290	198	368	304	725	515	198	101	565
18	470	350	266	318	209	386	406	780	470	188	101	406
19	386	350	266	350	209	386	368	1,080	406	178	101	304
20	334	780	266	318	209	470	350	900	386	169	101	254
21	290	4,440	254	290	198	515	426	780	386	160	114	231
22	254	2,050	242	278	188	515	448	780	448	160	108	266
23	242	1,420	426	266	188	725	448	725	350	152	101	266
24	540	1,020	840	242	188	725	670	565	304	144	95	242
25	1,020	780	565	254	178	615	900	565	278	144	95	209
26	590	670	565	242	178	515	615	565	368	144	95	188
27	406	590	615	220	178	448	515	565	386	136	89	178
28	290	515	515	220	178	386	492	615	318	128	89	178
29	266	448	515	220	....	368	492	670	304	128	89	169
30	242	448	515	220	....	386	540	840	290	128	89	160
31	231	....	492	318	....	470	....	1,020	....	121	89	....

Daily discharge, in second-feet, of South Fork of Snoqualmie River at North Bend, Wash., for the years ending Sept. 30, 1907–1915—Continued.

Day.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.
1911–12.												
1	144	114	492	290	830	378	428	535	650	354	118	454
2	144	114	426	290	770	378	480	480	710	330	118	317
3	144	114	386	290	650	354	480	480	562	286	107	274
4	144	128	386	278	590	330	590	480	562	286	131	235
5	136	178	368	266	535	330	480	480	650	286	131	208
6	136	368	368	266	508	308	454	480	770	286	131	194
7	128	960	368	266	508	286	428	650	830	286	118	219
8	128	780	515	266	535	286	454	950	830	286	144	308
9	121	515	642	266	770	286	480	1,130	710	266	144	282
10	144	386	615	290	950	286	590	950	590	246	144	242
11	144	318	615	290	830	286	562	770	590	246	144	216
12	136	318	565	350	770	286	508	890	590	246	144	188
13	128	368	492	780	620	266	480	1,130	562	246	131	174
14	160	780	470	2,450	650	266	454	1,410	620	246	118	171
15	242	*670*	448	1,690	710	286	428	1,410	508	246	144	165
16	220	540	515	1,130	1,270	286	428	890	428	227	227	153
17	178	1,970	470	890	1,270	286	428	710	480	208	330	144
18	160	4,150	426	770	1,070	308	428	770	535	208	191	141
19	160	4,740	426	650	890	286	428	890	590	191	174	139
20	152	*2,890*	386	650	710	286	378	1,550	650	174	174	139
21	144	1,570	350	620	620	286	378	1,270	590	174	159	134
22	136	1,020	426	590	590	266	354	890	454	174	144	123
23	136	780	492	590	620	266	378	710	428	174	144	118
24	144	642	426	710	535	286	378	650	454	174	131	118
25	136	*615*	386	1,070	480	286	378	770	480	174	131	118
26	128	1,490	386	770	480	308	378	890	454	159	131	116
27	128	780	350	830	428	330	378	950	403	159	131	114
28	121	670	350	950	428	378	403	890	330	144	118	118
29	121	670	318	1,550	403	428	480	770	286	144	118	118
30	114	565	318	1,690	......	378	620	620	286	144	131	118
31	114	......	318	1,130	......	378	......	650	......	131	286	......
1912–13.												
1	134	216	384	......	511	332	......	......	1,360	615	218	117
2	134	208	395	......	463	401	......	......	1,520	565	205	126
3	134	201	835	......	458	401	......	......	1,440	490	199	215
4	134	212	952	......	435	401	......	......	1,260	515	196	580
5	144	312	629	......	417	401	......	......	930	520	192	411
6	139	428	521	......	395	401	......	......	900	565	186	299
7	128	502	473	......	373	401	......	......	1,150	555	186	218
8	227	692	......	......	352	401	......	......	1,290	510	180	192
9	250	980	......	......	331	456	......	......	870	515	172	186
10	194	964	......	......	367	429	......	......	736	505	166	172
11	165	964	......	......	367	411	......	......	780	475	157	152
12	150	964	......	......	367	366	......	......	810	447	157	149
13	139	964	......	......	367	380	......	......	792	465	155	147
14	136	964	......	......	367	388	......	......	676	465	149	147
15	134	964	......	......	367	393	......	......	615	447	144	144
16	139	562	......	......	1,020	375	......	......	600	371	149	136
17	238	524	......	......	1,040	398	......	......	590	384	157	131
18	223	668	......	......	1,040	411	......	......	626	384	172	131
19	246	1,400	......	......	1,040	371	......	......	780	393	157	129
20	253	1,010	......	......	1,040	354	1,020	......	747	402	152	126
21	253	722	......	......	1,040	332	1,120	......	714	393	149	126
22	253	613	......	......	465	341	900	......	736	380	144	136
23	253	571	......	......	370	336	670	......	840	358	139	180
24	253	536	......	253	370	407	605	......	786	304	134	131
25	253	464	......	1,170	370	407	626	......	780	287	131	172
26	253	464	......	982	370	407	747	......	703	276	131	149
27	286	464	......	662	370	407	725	......	648	264	126	139
28	254	391	......	608	370	407	......	900	615	250	122	136
29	254	373	......	571	......	407	......	840	575	239	120	126
30	254	373	......	551	......	407	......	930	615	222	117	142
31	235	......	......	536	......	407	......	1,110	......	218	117	......

Daily discharge, in second-feet, of South Fork of Snoqualmie River at North Bend, Wash., for the years ending Sept. 30, 1907–1915—Continued.

Day.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.
1913–14.												
1	134	291	595	218	505	870	452	725	670	380	183	104
2	126	276	555	218	480	780	456	900	670	375	183	110
3	126	268	500	218	465	698	605	1,020	632	375	157	88
4	126	283	465	420	515	659	670	840	515	354	163	88
5	126	388	434	2,100	555	610	870	698	456	328	147	88
6	152	698	393	2,250	475	555	752	659	411	316	129	96
7	228	605	375	2,450	438	535	698	698	398	299	129	98
8	253	485	371	1,440	434	570	725	698	615	276	131	102
9	295	456	349	990	406	585	725	670	620	283	129	120
10	972	510	312	840	402	555	780	698	555	276	126	113
11	2,450	452	312	725	397	520	752	670	525	272	124	104
12	1,400	411	312	664	397	575	698	752	535	268	110	104
13	1,260	371	303	615	397	725	960	900	535	268	108	115
14	960	345	320	570	397	930	1,020	1,080	540	261	106	120
15	725	336	332	555	384	1,020	1,360	960	575	264	104	202
16	595	555	328	535	380	1,080	1,150	810	570	268	102	196
17	515	752	312	535	366	1,020	870	698	555	253	100	186
18	535	575	295	515	354	900	840	642	515	246	100	232
19	560	535	291	475	336	870	870	626	460	239	100	225
20	540	515	276	456	336	840	1,020	637	429	232	100	253
21	500	465	272	424	406	840	1,080	725	460	225	100	358
22	442	456	253	725	540	752	698	725	456	218	100	280
23	411	525	246	659	585	670	654	725	400	215	99	225
24	475	752	236	555	632	642	595	648	434	189	99	208
25	420	670	218	550	659	626	555	605	525	192	98	192
26	384	626	218	515	565	605	565	590	456	189	98	192
27	366	600	218	510	698	565	648	560	420	189	98	192
28	358	555	218	470	810	490	642	515	411	189	99	180
29	324	595	218	456	....	485	570	475	384	186	100	169
30	299	626	218	510	....	475	595	500	380	183	101	157
31	291	....	218	515	....	442	....	560	....	180	103	....

Daily discharge, in second-feet, of South Fork of Snoqualmie River at North Bend, Wash., for the years ending Sept. 30, 1907–1915—Continued.

Day.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.
1914–15.												
1	120	365	417	360	242	276	701	326	392	182	136	93
2	161	932	399	348	261	268	2,030	309	360	168	133	98
3	221	2,020	382	335	264	261	2,050	313	334	165	136	93
4	194	1,260	365	315	272	299	1,250	317	317	159	130	98
5	173	1,330	348	291	283	331	923	330	309	152	127	93
6	161	1,260	339	280	327	315	770	351	309	152	122	93
7	148	922	327	264	323	307	770	343	288	159	116	93
8	142	750	299	272	323	299	741	334	272	159	119	108
9	132	461	291	295	319	303	629	343	256	159	113	226
10	181	464	280	291	319	303	540	382	253	155	113	192
11	406	1,270	276	323	315	303	540	847	245	159	111	139
12	385	1,040	264	365	315	295	592	321	241	159	110	122
13	360	1,010	257	356	307	287	629	309	233	159	109	113
14	290	806	246	352	299	365	566	296	230	207	108	113
15	253	667	232	348	287	694	495	292	226	211	108	119
16	238	571	236	315	283	645	510	268	218	268	108	108
17	308	516	225	303	287	521	581	268	215	351	111	100
18	500	463	218	276	311	561	592	292	207	280	113	96
19	952	440	212	276	307	511	566	301	207	253	108	93
20	778	722	208	276	291	463	535	326	222	218	105	100
21	561	722	208	272	276	487	447	301	204	190	103	100
22	458	613	205	253	276	577	400	292	193	179	103	98
23	382	566	202	250	272	694	378	284	196	165	103	98
24	365	561	205	246	268	656	360	292	193	161	103	96
25	339	521	205	242	295	536	369	321	190	158	100	88
26	323	536	215	236	299	468	369	330	193	155	100	88
27	295	551	225	232	276	417	364	410	222	152	95	91
28	280	506	276	228	272	408	360	861	204	149	93	93
29	257	497	253	222	....	454	364	629	193	149	93	93
30	272	463	253	218	....	492	351	476	186	143	93	81
31	311	....	348	218	....	463	....	419	....	136	93	....

NOTE.—Discharge determined as follows: 1907–8—July 21, 1907, to Sept. 30, 1908, from rating curve well defined below 500 second-feet; interpolated for days on which gage was not read except Nov. 27 to Dec. 4, 1907, which was estimated from hydrographs of the North, Middle, and South forks at 1,180 second-feet. Gage readings probably erroneous Sept. 14–23 and 25–30; discharge interpolated.

1908–9—Oct. 2, 1908, to Sept. 30, 1909, from rating curve well defined below 500 second-feet; interpolated Oct. 1, 1908, as gage reading was probably erroneous; estimated from hydrograph Dec. 10, 1908, 330 second-feet, and Dec. 11, 1908, 435 second-feet.

1909–10—Oct. 1–31, 1909, from rating curve well defined below 500 second-feet; not ascertained for November, 1909, as water was over gage Nov. 2, 3, 19, 23, and 29, and extension of rating curves for high water is uncertain; Dec. 1, 1909, to Sept. 30, 1910, from rating curve well defined below 2,200 second-feet.

1910–11—Oct. 1, 1910, to Sept. 30, 1911, from rating curve well defined below 2,200 second-feet.

1911–12—Oct. 1, 1911, to Jan. 14, 1912, from rating curve well defined below 2,200 second-feet; Jan. 15 to Sept. 30, 1912, from rating curve well defined below 1,200 second-feet.

1912–13—Oct. 1 to Nov. 18, 1912, from rating curve well defined below 1,200 second-feet; Nov. 19, 1912, to Sept. 30, 1913, from rating curve well defined below 2,500 second-feet; estimated from hydrographs of 4 stations on the Snoqualmie Oct. 1–4, 1912, 134 second-feet; Oct. 20–26, 253 second-feet, Nov. 10–15, 964 second-feet; Nov. 25–27, 464 second-feet; Feb. 10–15, 1913, 367 second-feet; Feb. 17–21, 1,040 second-feet; Feb. 23–28, 370 second-feet; Mar. 2–8, 401 second-feet; Mar. 24–31, 407 second-feet.

1913–14—Oct. 1, 1913, to Sept. 30, 1914, from rating curve well defined below 2,500 second-feet except Aug. 3 to Sept. 30, when temporary dam on control and débris from repairing of bridge caused backwater; discharge for this period ascertained by method devised for shifting control.

1914–15—Oct. 1–19, 1914, by indirect method for shifting control, as temporary dam on control and debris from repairs to bridge caused backwater at the gage; Oct. 20, 1914, to Apr. 3, 1915, from curve well defined below 2,500 second-feet; Apr. 4 to Sept. 30, 1915, from rating curve well defined below 2,500 second-feet; interpolated July 24–27 and Aug. 12–14, as gage record was lacking.

Monthly discharge of South Fork of Snoqualmie River at North Bend, Wash., for the years ending Sept. 30, 1907–1915.

[Drainage area, 84 square miles.]

Month.	Discharge in second-feet.				Run-off.		Accuracy.
	Maximum.	Minimum.	Mean.	Per square mile.	Depth in inches on drainage area.	Total in acre-feet.	
1907.							
July 21–31	166	152	154	1.83	0.75	3,360	C.
August	288	128	171	2.04	2.35	10,500	C.
September	374	128	176	2.10	2.34	10,500	C.
The period	....	....	....	....	....	24,400	
1907–8.							
October	140	113	121	1.44	1.66	7,440	C.
November	....	180	417	4.96	5.53	24,800	C.
December	....	248	596	7.10	8.19	36,600	C.
January	510	212	361	4.30	4.96	22,200	C.
February	585	180	304	3.62	3.90	17,500	C.
July	890	212	497	5.92	6.82	30,600	C.
August	288	117	168	2.00	2.31	10,300	C.
September	140	77	109	1.30	1.45	6,490	C.
1908–9.							
October	950	68	220	2.62	3.02	13,500	C.
November	1,420	152	526	6.26	6.98	31,300	C.
December	1,070	230	416	4.95	5.71	25,600	C.
January	1,210	268	518	6.17	7.11	31,900	C.
February	950	248	423	5.04	5.25	23,500	C.
March	487	330	378	4.50	5.19	23,200	C.
April	950	330	475	5.66	6.32	28,300	C.
May	1,210	487	705	8.39	9.67	43,300	C.
June	1,960	464	807	9.61	10.72	48,000	C.
July	535	152	312	3.72	4.29	19,200	C.
August	152	86	109	1.30	1.50	6,700	C.
September	830	77	152	1.81	2.02	9,040	C.
The year	1,960	68	419	4.99	67.78	304,000	
1909–10.							
October	230	140	184	2.19	2.52	11,300	C.
December	1,730	198	508	6.05	6.98	31,200	C.
January	1,210	144	341	4.06	4.68	21,000	C.
February	900	144	288	3.43	3.57	16,000	C.
March	2,710	406	1,120	13.3	15.33	68,900	C.
April	1,570	426	717	8.54	9.53	42,700	C.
May	1,730	386	609	7.25	8.36	37,400	C.
June	515	160	270	3.21	3.58	16,100	C.
July	169	101	128	1.52	1.75	7,870	C.
August	95	79	84.8	1.01	1.16	5,210	C.
September	136	71	76.8	.914	1.02	4,570	C.
1910–11.							
October	2,890	160	574	6.83	7.87	35,300	C.
November	4,440	220	929	11.1	12.38	55,300	B.
December	840	242	456	5.43	6.26	28,000	A.
January	1,140	220	388	4.62	5.33	23,900	A.
February	304	178	213	2.54	2.64	11,800	A.
March	725	169	348	4.14	4.77	21,400	A.
April	900	266	412	4.90	5.47	24,500	A.
May	1,080	515	708	8.43	9.72	43,500	A.
June	1,080	278	546	6.50	7.25	32,500	A.
July	318	121	213	2.54	2.93	13,100	A.
August	121	89	104	1.24	1.43	6,400	A.
September	960	89	239	2.85	3.18	14,200	A.
The year	4,440	89	428	5.10	69.23	310,000	

Monthly discharge of South Fork of Snoqualmie River at North Bend, Wash., for the years ending Sept. 30, 1907–1915—Continued.

Month.	Discharge in second-feet.				Run-off.		Accuracy.
	Maximum.	Minimum.	Mean.	Per square mile.	Depth in inches on drainage area.	Total in acre-feet.	
1911–12.							
October	242	114	144	1.72	1.98	8,850	A.
November	4,740	114	973	11.6	12.94	57,900	B.
December	642	318	435	5.18	5.97	26,700	A.
January	2,450	266	739	8.80	10.14	45,400	B.
February	1,270	403	690	8.21	8.86	39,700	A.
March	428	266	311	3.70	4.27	19,100	A.
April	620	354	450	5.36	5.98	26,800	A.
May	1,550	480	842	10.0	11.53	51,800	A.
June	830	286	553	6.58	7.34	32,900	A.
July	354	131	223	2.65	3.06	13,700	A.
August	330	107	151	1.80	2.08	9,280	A.
September	454	114	185	2.20	2.46	11,000	A.
The year	4,740	107	473	5.63	76.61	343,000	
1912–13.							
October			201	2.39	2.76	12,400	C.
November		201	622	7.40	8.26	37,000	C.
February			530	6.31	6.57	29,400	C.
March			391	4.65	5.36	24,000	C.
June	1,520	575	849	10.1	11.27	50,500	A.
July	615	218	412	4.90	5.65	25,300	A.
August	218	117	157	1.87	2.16	9,650	A.
September	580	117	178	2.12	2.36	10,600	A.
1913–14.							
October	2,450	126	527	6.27	7.23	32,400	A.
November	752	268	499	5.94	6.63	29,700	A.
December	595	218	321	3.82	4.40	19,700	A.
January	2,450	218	732	8.71	10.04	45,000	A.
February	810	336	476	5.67	5.90	26,400	A.
March	1,080	442	693	8.25	9.51	42,600	A.
April	1,360	452	762	9.07	10.12	45,300	A.
May	1,080	475	710	8.45	9.74	43,700	A.
June	670	380	506	6.02	6.72	30,100	A.
July	380	180	258	3.07	3.54	15,900	A.
August	183	98	117	1.39	1.60	7,190	C.
September	358	88	163	1.94	2.16	9,700	C.
The year	2,450	88	480	5.71	77.59	348,000	
1914–15.							
October	952	120	321	3.82	4.40	19,700	B.
November	2,020	365	760	9.05	10.10	45,200	A.
December	417	202	271	3.23	3.72	16,700	A.
January	365	218	286	3.40	3.92	17,600	A.
February	327	242	292	3.48	3.62	16,200	A.
March	694	261	428	5.10	5.88	26,300	A.
April	2,050	351	659	7.85	8.76	39,200	A.
May	861	268	354	4.21	4.85	21,800	A.
June	392	186	244	2.90	3.24	14,500	A.
July	351	136	181	2.15	2.48	11,100	A.
August	136	93	110	1.31	1.51	6,760	A.
September	226	81	106	1.26	1.41	6,310	A.
The year	2,050	81	334	3.98	53.89	241,000	

TOKUL CREEK NEAR SNOQUALMIE, WASH.

Location.—In the NE. ¼ NW. ¼ sec. 20, T. 24 N., R. 8 E., 600 feet below dam site, 600 feet above bridge, 1¾ miles above junction with Snoqualmie River, 2 miles north of Snoqualmie, in King County.

Drainage area.—Not measured.

Records available.—July 21, 1907, to February 29, 1908; June 26, 1908, to October 31, 1914.

Gage.—Vertical staff on left bank 600 feet above bridge, read to tenths every second day July, 1907, to February, 1908, by Lydia Carlton and W. B. Neighbors, and daily, except Sunday, thereafter by George Richards and J. A. Isaminger.

Discharge measurements.—Made from bridge or by wading. Early measurements made from foot log near gage.

Channel and control.—Channel composed of small gravel and light alluvial material; shifting at high stages; banks low and wooded; one channel at all stages.

Extremes of discharge.—1907-1914: Maximum stage probably occurred in November, 1909. Stage reported higher than gage, 7.0 feet, in November, 1909, February, March, and November, 1910. Minimum stage recorded, 1.5 feet September 16–20. 1909 (discharge, 13 second-feet).

Winter flow.—Stage-discharge relation not affected by ice.

Diversions.—None.

Regulation.—None.

Accuracy.—Gage-height record prior to 1913 not very reliable. Rating curves fairly well defined at low water and uncertain at high water. Results fair except for high stages.

Cooperation.—Gage-height record and some discharge measurements furnished by the Puget Sound Traction, Light & Power Co.

Discharge measurements of Tokul Creek near Snoqualmie, Wash., during 1907-1914.

Date.	Made by—	Gage height.	Discharge.	Date.	Made by—	Gage height.	Discharge.
1907.		*Feet.*	*Sec.-ft.*	1912.		*Feet.*	*Sec.-ft.*
July 21	A. S. Kalenborn	1.52	22.0	May 10	H. C. Hanson	2.20	78
Sept. 17	.....do	1.78	32.3	Sept. 6	E. S. Fuller	2.43	86
1908.				1913.			
Sept. 24	M. T. Crawford	1.52	19.4	June 6	Rose and Eernisse	1.92	49.0
1909.				July 22	Parker, Rose, and Tuttle	1.91	46.6
Apr. 30	M. T. Crawford	3.35	102	1914.			
Aug. 27	A. T. Harris	1.70	19.4	Mar. 9	Rose and Dorfner	2.66	105
				Apr. 10	.....do	2.10	67
1910.				Aug. 18	Collier and Rose	1.50	25.9
Sept. 21	R. R. Easter	1.42	16.8				
1911.							
Sept. 14	G. L. Parker	2.25	52				

Daily discharge, in second-feet, of Tokul Creek near Snoqualmie, Wash., from July 21, 1907, to Oct. 31, 1914.

Day.	July.	Aug.	Sept.	Day.	July.	Aug.	Sept.	Day.	July.	Aug.	Sept.
1907.				1907.				1907.			
1	......	22	22	11	......	25	25	21	22	20	25
2	......	22	26	12	......	25	24	22	22	22	24
3	......	23	29	13	......	25	22	23	22	22	22
4	......	24	27	14	......	25	25	24	22	22	22
5	......	24	25	15	......	22	28	25	22	28	22
6	......	24	25	16	......	19	30	26	22	33	24
7	......	24	25	17	......	19	33	27	22	31	25
8	......	25	24	18	......	19	32	28	22	29	25
9	......	25	22	19	......	19	31	29	22	26	25
10	......	25	24	20	......	19	28	30	22	22	24
								31	22	22	......

Daily discharge, in second-feet, of Tokul Creek, near Snoqualmie, Wash., from July 21, 1807, to Oct. 31, 1914—Continued.

Day.	Oct.	Nov.	Dec.	Jan.	Feb.	June.	July.	Aug.	Sept.
1907–8.									
1	24	35	....	....	64	....	44	27	23
2	26	41	....	....	61	....	44	27	23
3	29	37	....	....	58	....	44	27	23
4	28	33	....	....	56	....	44	27	23
5	27	32	84	....	76	....	42	27	23
6	26	31	81	....	96	....	39	27	23
7	25	32	78	....	108	....	39	27	23
8	27	33	72	....	120	....	35	27	23
9	29	32	66	....	108	....	35	25	23
10	26	31	84	....	96	....	35	23	23
11	22	30	102	....	96	....	35	23	23
12	22	29	111	....	96	....	35	23	23
13	22	30	120	....	96	....	35	23	23
14	23	31	114	....	96	....	35	23	23
15	24	32	108	....	108	....	35	23	23
16	23	33	102	....	120	....	39	23	23
17	22	34	96	....	150	....	35	23	23
18	22	35	80	120	179	....	35	23	19
19	22	38	64	117	168	....	33	23	19
20	22	41	74	114	158	....	31	23	19
21	22	62	84	114	145	....	31	23	19
22	22	84	....	114	132	....	31	23	19
23	22	84	....	117	120	....	31	23	19
24	22	84	....	120	108	....	31	23	19
25	22	84	....	120	120	....	31	23	19
26	23	84	....	120	132	49	29	23	19
27	24	....	....	102	148	49	27	23	19
28	24	....	....	84	165	49	27	27	19
29	25	....	....	78	144	49	27	35	19
30	27	....	....	72	....	44	27	31	19
31	29	....	....	66	....	....	27	27	....

Day.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.
1908–9.												
1	27	35	76	200	259	210	112	100	64	23	16	16
2	23	39	76	221	252	217	106	97	64	19	16	16
3	23	39	76	218	252	217	100	94	64	19	16	16
4	23	39	76	214	252	224	103	106	59	19	16	16
5	23	39	76	193	259	217	106	106	59	19	16	16
6	23	39	76	179	266	217	100	100	56	23	16	16
7	23	39	76	179	266	214	94	94	54	27	16	16
8	23	39	82	179	266	210	94	88	54	27	16	16
9	23	39	82	172	259	210	94	103	49	23	16	16
10	23	39	82	165	259	203	94	118	44	23	16	16
11	23	39	82	158	252	189	91	112	44	23	16	16
12	23	39	82	158	238	182	88	106	44	23	16	16
13	27	35	82	158	231	182	82	100	42	19	16	16
14	27	35	82	158	180	182	76	94	39	19	16	16
15	27	40	82	158	130	182	94	94	39	19	16	16
16	27	44	82	172	196	175	94	91	35	19	16	13
17	27	49	82	186	210	175	88	88	31	19	16	13
18	27	144	82	200	196	175	94	82	27	19	16	13
19	27	106	82	270	217	175	100	82	27	19	16	13
20	27	118	82	312	217	175	94	82	27	19	16	13
21	27	130	82	280	214	172	88	76	27	19	16	31
22	27	140	82	280	210	168	82	76	27	19	16	27
23	27	151	82	259	217	161	94	76	27	19	16	23
24	27	130	144	256	217	154	94	76	27	19	16	23
25	27	112	158	252	210	142	94	70	27	18	16	23
26	27	100	193	238	203	130	94	70	23	16	18	21
27	27	88	204	238	210	124	100	70	23	16	19	19
28	27	82	214	231	210	115	118	70	23	19	16	19
29	27	82	207	224	....	106	112	70	23	19	18	23
30	27	82	207	224	....	112	106	70	23	16	17	23
31	31	....	200	....	....	118	....	70	....	16	16	....

Daily discharge, in second-feet, of Tokul Creek near Snoqualmie, Wash., from July 21, 1907, to Oct. 31, 1914—Continued.

Day.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.
1909–10.												
1	23	130	326	179	263	....	228	112	88	54	23	23
2	19	130	368	168	256	....	228	112	82	49	23	23
3	19	217	277	158	249	....	221	106	70	44	23	23
4	19	154	277	144	242	....	214	100	70	39	23	23
5	23	130	274	130	235	....	214	100	64	31	19	23
6	23	130	270	124	228	....	214	88	59	31	19	23
7	23	118	263	118	221	333	221	88	59	27	19	23
8	23	106	249	112	214	305	277	85	54	27	19	23
9	23	106	249	112	207	277	277	82	49	27	19	19
10	23	130	242	112	200	270	277	144	49	25	19	19
11	23	130	235	112	193	263	277	137	44	23	19	19
12	23	142	274	112	186	256	277	94	42	23	19	19
13	23	142	312	106	172	252	256	130	39	23	19	19
14	23	139	256	106	158	249	235	124	35	23	19	19
15	23	136	256	106	151	242	221	118	35	23	19	19
16	23	136	242	106	144	249	207	112	31	23	19	19
17	21	168	228	106	144	263	196	112	31	23	19	44
18	19	259	214	124	151	263	186	100	31	23	19	36
19	19	....	200	137	151	270	172	100	40	23	19	27
20	27	....	186	130	148	270	165	94	49	23	19	23
21	23	....	172	130	144	270	165	88	44	23	19	19
22	19	....	165	130	137	270	158	82	39	23	19	19
23	27	....	158	204	137	277	151	76	39	23	19	19
24	27	....	158	277	151	277	148	82	39	23	19	19
25	27	....	165	256	277	270	144	88	39	23	19	18
26	23	....	172	242	....	270	137	94	37	23	19	16
27	23	....	179	242	....	260	130	94	35	23	19	16
28	23	....	172	242	....	249	118	88	35	23	21	19
29	27	....	165	235	....	242	112	91	35	23	23	19
30	23	....	172	252	....	235	112	94	39	23	23	19
31	....	....	193	270	....	228	....	88	....	....	23	....
1910–11.												
1	39	112	200	151	193	124	106	44	112	39	27	16
2	98	112	193	151	179	124	106	44	106	39	27	16
3	158	118	193	158	172	118	106	70	100	39	27	24
4	151	118	204	172	172	118	100	76	91	39	27	31
5	137	118	214	200	162	124	94	88	82	39	23	31
6	118	142	228	214	151	130	88	82	82	39	23	31
7	235	165	235	214	130	172	88	110	76	35	23	27
8	228	172	256	232	124	172	88	137	70	35	23	31
9	186	....	249	249	124	165	100	130	64	35	23	35
10	144	....	235	235	124	151	112	124	64	35	23	35
11	137	....	224	228	124	144	94	112	54	35	19	35
12	144	....	214	221	152	140	88	242	44	35	19	39
13	137	....	200	200	179	137	88	347	39	35	19	39
14	130	298	193	186	179	130	82	319	35	31	19	59
15	130	256	186	179	172	130	82	291	35	31	19	106
16	137	214	179	172	165	130	79	207	35	31	19	144
17	144	207	172	172	158	124	76	228	35	31	19	116
18	137	193	158	200	172	124	106	249	35	31	19	88
19	130	221	144	221	179	124	112	291	35	31	23	64
20	118	....	137	256	186	124	100	256	35	31	21	40
21	112	....	130	249	172	118	94	232	35	31	19	44
22	106	....	130	242	165	112	94	207	35	31	19	44
23	118	....	144	235	158	112	85	165	35	29	19	35
24	130	....	172	235	151	112	76	158	35	27	19	35
25	124	....	176	207	151	130	70	207	37	27	19	35
26	112	298	179	179	144	127	64	186	39	27	19	31
27	106	260	179	172	137	124	59	172	54	27	19	31
28	94	221	165	172	130	118	54	158	49	27	19	31
29	94	214	165	165	....	112	49	144	49	27	16	31
30	100	200	158	158	....	106	46	130	44	27	16	31
31	106	....	151	158	....	106	....	124	....	27	16	....

Daily discharge, in second-feet, of Tokul Creek near Snoqualmie, Wash., from July 21, 1907, to Oct. 31, 1914—Continued.

Day.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.
1911–12.												
1	29	27	182	140	224	110	74	92	68	104	47	101
2	27	27	182	140	217	104	74	92	65	98	47	140
3	27	27	172	134	210	101	74	92	62	92	47	128
4	27	27	161	128	206	98	74	92	62	86	45	104
5	27	31	161	122	203	98	80	86	62	80	43	92
6	27	35	168	110	189	92	80	80	62	74	43	86
7	27	82	182	107	182	92	80	80	57	74	43	86
8	27	88	189	104	168	92	80	74	57	74	43	89
9	27	82	203	110	189	86	80	74	57	74	62	92
10	27	76	220	122	182	83	80	74	57	68	57	92
11	27	70	238	128	178	80	110	68	57	62	54	86
12	27	79	231	140	175	80	110	68	57	62	52	86
13	27	88	217	154	161	74	104	68	57	62	47	80
14	27	82	245	164	154	74	101	62	62	62	47	80
15	29	76	217	175	154	74	98	62	68	62	57	77
16	31	70	231	182	154	80	98	62	62	57	68	74
17	31	70	231	182	154	83	98	62	57	57	147	68
18	31	214	231	175	158	86	98	62	57	57	122	68
19	31	228	238	154	161	80	92	68	57	57	98	62
20	31	242	238	140	154	80	92	74	62	57	86	62
21	31	259	224	144	154	74	92	74	68	54	80	57
22	31	238	224	147	147	74	92	80	68	52	74	57
23	31	231	217	140	147	74	92	80	65	52	68	57
24	31	224	210	154	134	74	92	80	62	52	68	57
25	31	245	203	182	128	74	86	86	57	52	65	57
26	27	228	189	196	122	68	86	83	57	52	62	57
27	27	210	182	224	122	68	86	80	57	52	62	57
28	27	203	168	231	116	68	86	74	57	50	57	57
29	27	189	161	238	116	74	86	68	57	47	57	57
30	27	182	147	238	......	74	92	68	80	47	57	57
31	27	......	......	231	......	74	......	68	......	47	62	......
1912–13.												
1	57	86	98	287	168	86	147	57	54	74	42	33
2	57	86	92	252	168	86	134	57	52	68	42	33
3	57	89	110	364	168	86	116	57	52	62	42	52
4	57	92	203	336	168	104	122	54	52	62	42	52
5	62	98	196	......	154	104	140	52	47	62	42	52
6	65	110	182	......	140	98	137	52	47	62	37	47
7	68	203	161	......	128	98	134	52	47	62	37	47
8	74	245	142	224	116	92	122	62	47	57	37	47
9	74	336	122	217	113	92	116	74	47	57	37	47
10	74	315	110	189	110	92	104	74	47	57	37	47
11	74	294	98	175	104	92	98	74	47	52	37	47
12	68	280	98	......	98	98	98	74	47	52	37	47
13	65	308	92	......	98	98	98	68	47	57	37	42
14	62	301	104	......	104	98	98	68	47	62	37	42
15	62	273	110	......	104	92	98	68	47	57	37	42
16	62	259	116	......	157	116	92	134	47	57	37	42
17	62	238	110	......	210	140	86	122	47	57	37	42
18	62	217	128	......	231	168	80	98	47	52	37	42
19	92	294	116	......	217	182	74	74	52	52	37	42
20	92	287	110	98	196	161	71	68	52	50	37	37
21	92	252	116	98	168	134	68	62	52	47	37	40
22	92	224	113	92	154	116	68	62	54	47	37	42
23	104	203	110	92	141	110	62	57	57	47	37	42
24	116	182	116	140	128	104	62	57	68	47	35	42
25	140	161	116	400	122	98	62	57	68	47	33	37
26	140	140	116	350	110	92	62	57	68	47	33	37
27	125	122	110	308	98	110	62	62	62	47	33	37
28	110	116	116	266	92	147	62	62	62	47	33	40
29	104	110	216	217	......	182	62	62	62	47	33	42
30	98	104	315	196	......	175	57	57	62	47	33	42
31	86	......	315	182	......	168	......	57	......	42	33	......

Daily discharge, in second-feet, of Tokul Creek near Snoqualmie, Wash., from July 21, 1907, to Oct. 31, 1914—Continued.

Day.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.
1913–14.													
1	37	74	217	86	168	164	86	84	44	49	30	24	28
2	37	71	203	86	161	189	80	84	44	49	28	24	28
3	37	68	189	80	154	175	80	80	39	44	26	24	28
4	42	68	175	120	182	161	74	75	39	44	26	24	28
5	42	134	154	273	175	140	72	69	39	44	26	24	28
6	42	175	147	329	154	128	71	66	39	44	26	24	30
7	98	161	138	350	147	116	71	63	48	39	26	24	30
8	92	147	128	329	140	110	71	60	57	39	26	26	32
9	98	144	122	280	134	104	68	60	84	39	26	30	32
10	110	140	110	245	128	98	68	60	78	39	26	26	36
11	189	122	110	224	134	98	68	60	69	39	26	26	49
12	182	116	98	203	147	92	70	57	63	36	26	26	44
13	175	104	92	189	161	92	71	54	57	34	26	26	44
14	217	98	95	182	161	92	80	52	54	34	26	26	42
15	189	92	98	189	154	95	110	52	52	34	26	30	42
16	175	120	86	196	147	98	122	49	49	34	26	32	39
17	147	147	80	196	134	86	122	49	49	34	26	30	60
18	128	161	86	186	122	86	189	49	49	34	26	34	63
19	116	154	80	175	116	86	148	44	49	34	26	42	108
20	104	175	80	161	110	80	108	44	49	34	26	37	108
21	98	182	74	161	104	77	96	44	52	34	26	32	84
22	92	182	68	294	113	77	84	44	54	34	26	30	75
23	86	200	68	308	122	77	84	44	49	30	26	30	66
24	92	217	62	266	134	77	75	44	52	30	26	28	49
25	98	217	62	248	140	80	72	44	69	30	26	28	57
26	95	224	62	231	131	86	81	44	60	30	26	28	54
27	92	210	57	217	137	80	90	49	57	30	26	29	54
28	86	189	62	203	140	80	120	57	56	30	24	30	49
29	86	203	68	182	......	80	108	49	54	30	24	28	46
30	80	210	62	182	......	80	96	46	52	30	24	28	57
31	74	......	74	175	......	80	......	......	......	30	24	......	54

NOTE.—Discharge ascertained from six rating curves fairly well defined below 100 second-feet and applicable as follows: July 21, 1907, to Feb. 29, 1908; June 26, 1908, to Jan. 20, 1909, and Dec. 1, 1909, to Nov. 20, 1911; Jan. 21 to Nov. 18, 1909; Nov. 21, 1911, to Jan. 25, 1913, and Jan. 8, 1914, to Apr. 18, 1914; Jan. 26, 1913, to Jan. 7, 1914; and Apr. 19 to Oct. 31, 1914. July 21 to Dec. 21, 1907, and Jan. 18 to Feb. 1908, discharge interpolated when gage was not read except for Nov. 27–30, and Dec. 1–4, which was estimated from hydrographs of this and three stations on Snoqualmie River at 280 and 240 second-feet, respectively. Nov. 19–31, 1909, water over gage, discharge not estimated. Feb. 26–28, Mar. 1–6, Nov. 9–13, and 20–25, 1910, water over gage, daily discharge for periods estimated from hydrographs at 565, 755, 585, and 645 second-feet, respectively. Jan. 5–7, and 12–19, 1913, snow so deep that gage could not be read; discharge estimated from hydrographs at 265 and 135 second-feet, respectively. Jan. 25, 1913, water over gage; discharge 25 and 26 estimated from hydrographs at 400 and 350 second-feet, respectively. Jan. 4, 1914, discharge estimated from hydrographs at 120 second-feet. Discharge interpolated on Sundays and a few other days on which gage was not read.

Monthly discharge of Tokul Creek near Snoqualmie, Wash., for the years ending Sept. 30, 1907–1914.

Month.	Discharge in second-feet.			Run-off (total in acre-feet).	Accuracy.
	Maximum.	Minimum.	Mean.		
1907.					
July 21–31	22	22	22.0	480	C.
August	33	19	23.6	1,450	C.
September	33	22	25.5	1,520	C.
The period	....	....	....	3,450	
1907–8.					
October	29	22	24.3	1,490	C.
November	....	29	75.7	4,500	C.
February	179	56	115.	6,620	C.
July	44	27	34.5	2,120	C.
August	35	23	25.0	1,540	C.
September	23	19	21.3	1,270	D.
1908–9.					
October	31	23	25.7	1,580	C.
November	151	35	71.1	4,230	C.
December	214	76	109	6,700	C.
January	312	158	204	12,500	D.
February	266	130	227	12,600	D.
March	224	106	175	10,800	D.
April	118	76	96.2	5,720	C.
May	118	70	88.1	5,420	C.
June	64	23	39.1	2,330	C.
July	27	16	19.9	1,220	D.
August	19	16	16.3	1,000	D.
September	31	13	17.9	1,070	D.
The year	312	13	90.0	65,200	
1909–10.					
October	27	19	22.1	1,360	D.
December	368	158	228	14,000	D.
January	277	106	161	9,900	D.
February	....	137	230	12,800	D.
March	....	228	359	22,100	D.
April	277	112	198	11,800	D.
May	144	76	100	6,150	C.
June	88	31	46.7	2,780	C.
July	54	23	26.3	1,620	D.
August	23	19	20.0	1,230	D.
September	44	16	21.6	1,290	C.
1910–11.					
October	235	39	130	7,990	C.
November	....	112	348	20,700	D.
December	256	130	186	11,400	D.
January	256	151	199	12,200	D.
February	193	124	157	8,720	D.
March	172	106	128	7,870	C.
April	112	46	86.2	5,130	C.
May	347	44	172	10,600	D.
June	112	35	54.7	3,250	C.
July	39	27	32.4	1,990	C.
August	27	16	20.7	1,270	D.
September	144	16	45.5	2,710	C.
The year	....	16	130	93,800	
1911–12.					
October	31	27	28.1	1,730	C.
November	259	27	131	7,800	C.
December	245	147	196	12,100	D.
January	238	104	159	9,780	D.
February	224	116	164	9,430	D.
March	110	68	82.0	5,040	C.
April	110	74	88.9	5,290	C.
May	92	62	75.3	4,630	C.
June	80	57	61.1	3,640	C.
July	104	47	63.7	3,920	C.
August	147	43	63.5	3,900	C.
September	140	57	77.4	4,610	C.
The year	259	27	98.9	71,900	

Monthly discharge of Tokul Creek near Snoqualmie, Wash., for the years ending Sept 30, 1907–1914—Continued.

Month.	Discharge in second-feet.			Run-off (total in acre-feet).	Accuracy.
	Maximum.	Minimum.	Mean.		
1912–13.					
October	140	57	82.4	5,070	C.
November	336	86	201	12,000	C.
December	315	92	137	8,420	C.
January	....	92	205	12,600	D.
February	231	92	142	7,890	D.
March	182	86	117	7,190	C.
April	147	57	93.1	5,540	C.
May	134	52	67.5	4,150	C.
June	68	47	52.9	3,150	C.
July	74	42	54.3	3,340	C.
August	42	33	36.8	2,260	C.
September	52	33	42.8	2,550	C.
The year	....	33	102	74,200	
1913–14.					
October	217	37	104	6,400	C.
November	224	68	150	8,930	D.
December	217	57	103	6,330	C.
January	350	80	211	13,000	D.
February	182	104	141	7,830	C.
March	189	77	102	6,270	C.
April	189	68	91.2	5,430	C.
May	84	44	54.1	3,330	C.
June	• 84	39	53.5	3,180	C.
July	49	30	36.0	2,210	C.
August	30	24	25.9	1,590	C.
September	42	24	28.3	1,680	C.
The year	350	24	91.5	66,200	

NOTE.—Mean discharge October, 1914, 49.8 second-feet; run-off, 3,060 acre-feet.

SOUTH FORK OF STILAGUAMISH RIVER NEAR SILVERTON, WASH.

LOCATION.—In the SW. ¼ sec. 23, T. 30 N., R. 9 E., one-eighth mile above the Silverton ranger station, about one-fourth mile below Martin Creek, 2½ miles below Silverton, in Snohomish County, and about 5 miles above Gold Basin.

DRAINAGE AREA.—45.4 square miles (measured on topographic maps).

RECORDS AVAILABLE.—September 1, 1910, to September 30, 1915 (fragmentary).

GAGE.—Vertical staff spiked to overhanging hemlock on right bank.

DISCHARGE MEASUREMENTS.—Made from a cable 30 feet below gage or by wading.

CHANNEL AND CONTROL.—Right bank fairly high; not subject to overflow; left bank slopes back gradually and is covered by dense growth of alder. Control 100 feet below gage, composed of large boulders; may shift during floods. Stage of zero flow, determined October 30, 1913, gage height —0.5 foot ±0.2 foot.

EXTREMES OF DISCHARGE.—Maximum stage recorded during year, 5.2 feet at 5 p. m., April 2 (discharge, 3,450 second-feet); minimum stage recorded, 0.70 foot, September 7, 23, 25, 26, 29–30 (discharge, 29 second-feet).

1910–1915: Maximum stage recorded, 7 feet November 20, 1910 (discharge, 5,720 second-feet, revised); minimum stage recorded September 7, 23, 25–26, 29–30, 1915.

WINTER FLOW.—Stage-discharge relation seldom affected by ice.

DIVERSIONS.—None.

REGULATION.—None.

ACCURACY.—Determinations of discharge below 2,000 second-feet, excellent. Small diurnal fluctuation during summer months.

COOPERATION.—Gage height record furnished by United States Forest Service.

Discharge measurements of South Fork of Stilaguamish River near Silverton, Wash., during the year ending Sept. 30, 1915.

Date	Made by—	Gage height.	Discharge.
		Feet.	*Sec.-ft.*
Mar. 3	J. T. Hartson	1.34	125
June 10	C. G. Paulsen	1.34	136
Sept. 5	.....do	.71	29.6

Daily discharge, in second-feet, of South Fork of Stilaguamish River near Silverton, Wash., for the year ending Sept. 30, 1915.

Day.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.
1	170	485	308	485	285	154	1,520	140	262	112	59	31
2	154	2,520	262	308	222	140	3,450	125	308	99	59	31
3	154	1,340	222	389	186	137	1,610	140	186	99	47	31
4	154	1,610	222	308	170	204	1,170	154	222	99	49	31
5	125	1,170	222	222	308	186	1,000	222	222	88	49	30
6	140	732	186	186	360	170	1,000	154	222	76	47	30
7	131	550	154	170	262	186	389	186	262	68	47	29
8	99	485	154	204	242	170	360	186	262	99	45	154
9	99	425	154	186	308	154	360	262	186	99	45	76
10	425	360	125	186	262	170	308	262	137	99	42	76
11	425	620	99	518	222	154	425	222	140	99	42	59
12	520	695	99	334	186	154	770	222	125	99	42	59
13	390	845	76	222	170	154	485	186	125	112	42	45
14	280	518	99	204	154	1,170	360	222	125	112	42	50
15	222	360	99	170	140	1,000	383	154	112	308	39	55
16	222	308	99	154	140	389	372	154	112	360	39	49
17	658	262	76	154	334	485	334	186	112	222	37	40
18	1,800	308	76	140	285	550	262	222	125	222	37	37
19	2,000	360	76	140	222	389	262	262	122	222	37	37
20	845	1,080	76	154	222	425	262	222	118	154	35	36
21	360	550	76	140	186	485	262	186	115	99	35	34
22	308	485	59	140	170	550	262	186	112	76	33	33
23	308	695	59	125	170	518	242	222	112	76	33	29
24	262	425	47	112	170	360	222	262	112	59	33	29
25	222	620	37	112	204	334	222	308	125	59	33	29
26	215	550	76	99	170	262	222	308	125	59	31	29
27	186	550	99	88	154	242	222	1,000	112	59	31	37
28	186	518	99	76	154	242	186	845	112	88	31	37
29	170	425	99	88	....	308	170	425	112	59	31	29
30	254	425	154	99	....	360	154	308	112	59	31	29
31	334	....	308	154	....	770	....	262	....	59	31	....

NOTE.—Discharge ascertained from a rating curve well defined below 2,000 second-feet. Discharge estimated, for lack of gage readings, by hydrographic comparison with record of South Fork of Stilaguamish River at Granite Falls, Oct. 12–14, June 19–21, Sept. 12–15, 17, 20, 21, and 24.

Monthly discharge of South Fork of Stilaguamish River near Silverton, Wash., for the year ending Sept. 30, 1915.

[Drainage area, 45.4 square miles.]

Month.	Discharge in second-feet.				Run-off.		Accuracy.
	Maximum.	Minimum.	Mean.	Per square mile.	Depth in inches on drainage area.	Total in acre-feet.	
October	2,000	99	381	8.39	9.67	23,400	A.
November	2,520	262	676	14.9	16.62	40,200	A.
December	308	37	129	2.84	3.27	7,930	A.
January	518	76	196	4.32	4.98	12,100	A.
February	360	140	216	4.76	4.96	12,000	A.
March	1,170	137	354	7.80	8.99	21,800	A.
April	3,450	154	575	12.7	14.17	34,200	A.
May	1,000	125	264	5.81	6.70	16,200	A.
June	308	112	154	3.39	3.78	9,160	A.
July	360	59	116	2.56	2.95	7,130	A.
August	59	31	39.8	.877	1.01	2,450	A.
September	154	29	43.4	.956	1.07	2,580	A.
The year	3,450	29	261	5.75	78.17	189,000	

SOUTH FORK OF STILAGUAMISH RIVER AT GRANITE FALLS, WASH.

Location.—In the SE. ¼ sec. 12, T. 30 N., R. 6 E., at highway bridge 400 feet below Canyon Creek and about a mile north of Granite Falls, in Snohomish County.

Drainage area.—182 square miles (measured on topographic maps).

Records available.—June 19 to October 31, 1911. September 13, 1913, to October 31, 1915, when station was discontinued.

Gage.—Chain gage attached to upstream handrail of highway bridge; read once daily to hundredths by Miss Elsie Wilson.

Discharge measurements.—Made from bridge.

Channel and control.—Boulders and gravel; shifting at high stages; one channel at all stages. Left bank high; right bank low and wooded.

Extremes of discharge.—Maximum stage recorded October 1, 1914, to October 31, 1915, 7.8 feet October 31, 1915 (discharge, 6,700 second-feet); minimum stage recorded, 1.25 feet September 28 (discharge, 64 second-feet).

1911; 1913–1915; maximum stage recorded, 11.05 feet January 6, 1914 (discharge, 11,700 second-feet); minimum stage recorded on September 28, 1915.

Winter flow.—Stage-discharge relation not affected by ice.

Diversions.—None.

Regulation.—None.

Accuracy.—Results excellent between limits of well-defined rating curves. Some diurnal fluctuation June to September.

Discharge measurements of South Fork of Stilaguamish River at Granite Falls, Wash., during the year ending Sept. 30, 1915.

Date.	Made by—	Gage height.	Discharge.	Date.	Made by—	Gage height.	Discharge.
		Feet.	*Sec.-ft.*			*Feet.*	*Sec.-ft.*
Nov. 15	I. L. Collier	3.96	1,500	June 9	C. G. Paulsen	2.44	401
Mar. 5	J. T. Hartson	3.28	966	11	.....do	2.43	396
16	.....do	4.54	2,100	Sept. 4	.....do	1.54	116
16	.....do	4.37	1,890				

Daily discharge, in second-feet, of South Fork of Stilaguamish River at Granite Falls, Wash., for the year ending Sept. 30, 1915.

Day.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.
1	563	1,720	980	1,820	1,280	536	2,910	382	798	268	192	157	95
2	875	3,860	840	1,440	742	396	5,120	405	700	268	152	134	3,130
3	775	3,170	808	2,400	1,360	486	3,400	452	611	268	206	80	1,280
4	679	4,000	710	1,620	775	679	1,630	452	502	252	221	97	428
5	536	4,560	840	1,120	2,040	840	1,540	476	582	152	129	152	382
6	418	2,280	710	1,050	2,040	563	1,280	528	528	152	108	129	221
7	396	2,040	536	1,050	1,360	875	1,630	555	555	236	152	147	268
8	440	1,620	536	1,280	1,200	679	1,280	452	476	555	206	1,040	252
9	396	1,930	536	1,280	1,360	648	1,040	502	405	321	129	340	206
10	742	2,280	486	1,050	1,120	910	798	700	405	221	102	236	206
11	1,930	3,040	536	3,170	910	710	798	611	405	152	80	206	192
12	3,860	1,720	440	2,280	775	563	900	452	382	165	80	206	1,360
13	1,360	3,440	440	1,530	742	536	798	405	361	340	86	155	2,740
14	980	2,280	315	1,360	648	4,280	830	502	252	476	102	178	1,630
15	840	1,530	188	1,280	710	4,280	765	502	321	1,730	129	221	865
16	742	1,200	216	910	679	2,040	732	582	302	1,730	147	160	502
17	1,820	980	279	875	1,820	1,200	865	611	321	970	152	152	428
18	5,360	536	315	808	910	1,930	970	670	363	640	157	178	528
19	3,860	1,050	396	840	563	1,280	900	900	405	476	93	165	670
20	2,520	2,400	354	875	486	563	798	798	382	361	108	157	582
21	1,440	1,930	279	840	486	1,200	670	582	361	321	118	108	528
22	1,200	1,360	375	648	463	1,440	528	582	361	268	108	152	765
23	1,050	1,720	334	536	648	1,440	640	502	340	302	100	108	1,730
24	875	1,440	315	440	710	1,280	582	970	285	252	80	80	2,260
25	775	1,200	354	476	980	1,120	502	1,280	285	285	114	69	2,500
26	710	3,170	396	511	775	910	382	1,280	268	321	136	89	2,260
27	590	1,820	563	536	590	910	340	1,450	302	236	72	80	2,380
28	486	2,160	1,530	536	775	910	285	1,730	206	252	123	64	4,120
29	463	1,720	840	463	....	1,280	428	1,540	206	206	152	72	1,540
30	840	1,050	980	536	....	1,120	405	1,360	252	221	72	68	1,360
31	1,530	....	2,160	910	....	840	....	830	......	221	72	......	6,700

NOTE.—Discharge Oct. 1 to Apr. 2 ascertained from rating curve well defined below 3,000 second-feet Apr. 3 to Oct. 31, from rating curve well defined below 700 second-feet and fairly well defined between 700 and 1,500 second-feet. Gage not read Jan. 25 and June 18; discharge interpolated.

Monthly discharge of South Fork of Stilaguamish River at Granite Falls, Wash., for the year ending Sept. 30, 1915.

[Drainage area, 182 square miles.]

Month.	Discharge in second-feet.				Run-off.		Accuracy.
	Maximum.	Minimum.	Mean.	Per square mile.	Depth in inches on drainage area.	Total in acre-feet.	
October	5,360	396	1,260	6.92	7.98	77,500	A.
November	4,560	536	2,110	11.6	12.94	126,000	A.
December	2,160	188	600	3.30	3.80	36,900	A.
January	3,170	440	1,110	6.10	7.03	68,200	A.
February	2,040	463	962	5.29	5.51	53,400	A.
March	4,280	396	1,180	6.48	7.47	72,600	A.
April	5,120	285	1,120	6.15	6.86	66,600	B.
May	1,730	382	743	4.08	4.70	45,700	B.
June	798	206	397	2.18	2.43	23,600	A.
July	1,730	152	407	2.24	2.58	25,000	A.
August	221	72	125	.687	.79	7,690	B.
September	1,040	64	173	.951	1.06	10,300	B.
The year	5,360	64	847	4.65	63.15	613,000	

NOTE.—Mean discharge for October, 1915, 1,360 second-feet; discharge per square mile, 7.47 second-feet; depth in inches on drainage area, 8.61; run-off in acre-feet, 83,600 acre-feet.

SKAGIT RIVER AT REFLECTOR BAR, NEAR MARBLEMOUNT, WASH.

Location.—In sec. 8, T. 37 N., R. 13 E. Willamette meridian (unsurveyed), just below mouth of Canyon Diablo, at Reflector Bar ranger station, three-fourths mile above Stetattle Creek, 1½ miles below Thunder Creek, and 23 miles, by trail, northeast of Marblemount, in Whatcom County.

Drainage area.—Nor measured.

Records available.—December 1, 1913, to September 30, 1915.

Gage.—Since April 13, 1914, Stevens water-stage recorder, on right bank, 75 feet below mouth of Canyon Diablo; inspected by Henry Soll. Prior to April 13, 1914, inclined staff at same location, but at datum 2.00 feet higher.

Discharge measurements.—Made from cable 50 feet below gage.

Channel and control.—One channel at all stages. Banks not subject to overflow. Control 200 feet below gage, composed of large boulders near right bank, clean gravel in center, and sand near left bank; may shift during floods. Stage of zero flow, gage height 0.0±0.1 foot.

Extremes of discharge.—Maximum stage during year, from water-stage recorder, 6.52 feet at 4 a. m., April 3 (discharge, 11,800 second-feet); minimum stage, from recorder, 1.74 feet from 1 a. m. to 10 a. m., January 28 (discharge, 707 second-feet).

1913–1915: Maximum stage, from water-stage recorder, 7.28 feet at 6.30 a. m. May 15, 1914 (discharge, 14,700 second-feet); minimum stage, from recorder, January 28, 1915.

Winter flow.—Stage-discharge relation not affected by ice.

Diversions.—None.

Regulation.—None.

Accuracy.—Results excellent.

Cooperation—Gage-height record furnished by United States Forest Service. Equipment furnished and installed by Stone & Webster Engineering Corporation.

Discharge measurements of Skagit River at Reflector Bar, near Marblemount, Wash., during the year ending Sept. 30, 1915.

Date.	Made by—	Gage height.	Discharge.	Date.	Made by—	Gage height.	Discharge.
		Feet.	*Sec.-ft.*			*Feet.*	*Sec.-ft.*
Feb. 19	J. T. Hartson	1.84	806	July 20	C. G. Paulsen	3.55	3,160
20	.....do	1.83	776	Sept. 10	.....do	2.32	1,310

Daily discharge, in second-feet, of Skagit River at Reflector Bar, near Marblemount, Wash., for the year ending Sept. 30, 1915.

Day.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.
1	1,810	4,340	3,500	1,070	764	832	3,020	3,800	4,120	4,340	4,120	2,390
2	1,600	5,340	3,200	1,060	747	824	8,880	3,500	3,900	4,700	4,230	2,220
3	1,510	5,190	3,020	1,110	747	832	10,700	3,500	3,700	4,940	3,900	2,480
4	1,370	5,630	2,830	1,070	755	869	7,800	3,600	4,070	5,060	3,300	3,740
5	1,320	5,450	2,650	1,030	764	878	6,120	3,900	5,060	4,700	3,310	2,250
6	1,240	4,580	2,480	1,020	764	878	5,600	4,630	5,840	4,230	3,600	1,760
7	1,260	3,900	2,390	991	747	850	5,200	5,710	5,840	3,700	3,360	1,470
8	1,370	3,600	2,220	991	739	824	5,000	6,260	4,820	4,010	3,300	1,540
9	1,600	3,700	2,060	972	739	840	4,600	6,260	4,120	3,500	3,300	1,390
10	1,540	3,400	1,900	952	755	856	4,300	5,980	3,700	2,920	3,300	1,250
11	1,440	4,030	1,750	962	755	873	4,300	5,060	3,600	2,650	3,300	1,200
12	1,540	3,800	1,640	972	755	889	4,300	4,580	3,800	2,740	3,020	1,080
13	1,900	3,800	1,540	952	772	905	4,580	4,340	3,900	2,650	3,220	991
14	1,880	3,300	1,490	943	747	991	4,340	4,340	4,120	2,560	3,500	962
15	1,900	3,020	1,520	924	747	1,680	4,230	4,340	4,340	2,830	3,600	1,060
16	2,100	2,830	1,410	896	747	1,640	4,580	4,340	4,460	3,020	3,600	1,280
17	2,960	2,650	1,370	878	772	1,580	5,580	4,340	4,120	2,740	3,480	1,470
18	2,650	2,560	1,350	878	807	1,610	6,400	4,340	3,800	2,740	3,200	1,580
19	3,020	2,560	1,330	869	798	1,720	6,680	4,340	3,400	3,020	3,400	1,610
20	2,560	3,100	1,260	850	781	1,870	6,680	4,340	3,200	3,500	3,700	1,470
21	2,220	3,500	1,250	824	772	1,900	5,450	4,340	3,300	4,010	4,010	1,540
22	2,060	3,300	1,250	747	772	2,390	4,700	4,580	3,700	3,800	4,120	1,570
23	1,860	3,300	1,240	815	781	2,920	4,230	4,340	4,010	3,600	3,980	1,530
24	1,780	3,300	1,220	772	781	2,920	4,120	4,230	4,010	3,700	3,900	1,370
25	1,740	3,800	1,180	755	798	2,650	3,900	4,120	3,500	3,800	3,500	1,310
26	1,720	4,580	1,140	755	807	2,390	4,230	3,900	2,920	3,500	3,200	1,250
27	1,720	4,580	1,140	739	815	2,220	4,120	4,370	2,650	3,500	3,110	1,140
28	1,720	4,460	1,120	747	815	2,140	4,010	5,710	2,740	3,400	3,070	982
29	1,760	4,010	1,090	772	....	2,220	4,340	4,940	3,200	3,400	3,330	1,030
30	3,000	3,700	1,060	764	....	2,220	4,120	4,230	3,800	3,900	3,400	1,130
31	3,200	....	1,080	764	....	2,220	....	4,010	....	4,120	2,650	....

NOTE.—Discharge ascertained from well-defined rating curve. Gage heights not available for following periods: Mar. 9–12, discharge interpolated; Apr. 6–12, discharge estimated by comparison of hydrograph based on flow of Skagit River at Sedro Woolley less that of Baker River below Anderson Creek near Concrete and Sauk River at Darrington; May 13–21, mean discharge estimated at 4,340 second-feet.

Monthly discharge of Skagit River at Reflector Bar, near Marblemount, Wash., for the year ending Sept. 30, 1915.

Month.	Discharge in second-feet.			Run-off (total in acre-feet).	Accuracy.
	Maximum.	Minimum.	Mean.		
October	3,200	1,240	1,910	117,000	A.
November	5,630	2,560	3,840	228,000	A.
December	3,500	1,060	1,730	106,000	A.
January	1,110	739	899	55,300	A.
February	815	739	769	42,700	A.
March	2,920	824	1,560	95,900	A.
April	10,700	3,020	5,200	309,000	A.
May	6,260	3,500	4,520	278,000	A.
June	5,840	2,650	3,920	233,000	A.
July	5,060	2,560	3,590	221,000	A.
August	4,230	2,650	3,480	214,000	A.
September	2,740	962	1,500	89,300	A.
The year	10,700	739	2,750	1,990,000	

SKAGIT RIVER NEAR SEDRO WOOLLEY, WASH.

Location.—In the NW. ¼ sec. 36, T. 35 N., R. 4 E., at Northern Pacific Railway bridge three-fourths mile below intake of Beatty's slough, 1½ miles south of Sedro Woolley, in Skagit County, 21 miles above mouth, and 32 miles below Baker River. Elevation of low water about 25 feet above tide.

Drainage area.—2,930 square miles (measured on General Land Office map).

Records available.—May 1, 1908, to September 30, 1915.

Gage.—Vertical staff on cribbing 100 feet above draw-span pier of Northern Pacific Railway bridge. Datum, extreme low tide in Puget Sound. Temporary gage installed September 25, on downstream side of group of piles, 50 feet above third concrete pier (from left bank) of railway bridge; used September 26–30. Gage read to half-tenths daily, and in addition crest gage heights observed or estimated by E. J. Woods.

Discharge measurements.—Made from highway bridge one-third mile above gage. Beatty's slough measured from highway bridge.

Channel and control.—Gravel; shifts at high stages. Banks not subject to overflow except during extreme floods.

Extremes of discharge.—Maximum stage recorded during year, 45.4 feet at 11 a. m., April 3 (discharge, 58,100 second-feet); minimum stage recorded, 32.3 feet at 7 a. m., September 29–30 (discharge, 2,740 second-feet).

1908–1915: Maximum stage recorded, 56.1 feet November 30, 1909 (discharge, 96,100 second-feet); minimum stage recorded, 32.3 feet September 29–30, 1915 (discharge, 2,740 second-feet).

Winter flow.—Stage-discharge relation seldom affected by ice.

Diversion.—Beatty's slough carries from 1.5 per cent of total flow at low stages to 8 per cent at high stages. Amount determined each visit and added to flow measured in river proper.

Regulation.—None.

Accuracy.—Discharge relation changed during high water in November. Practically no diurnal fluctuation. Results excellent December to August; good before and after.

Discharge measurements of Skagit River near Sedro Woolley, Wash., during the year ending Sept. 30, 1915.

Date.	Made by—	Gage height.	Discharge.	Date.	Made by—	Gage height.	Discharge.
		Feet.	*Sec.-ft.*			*Feet.*	*Sec.-ft.*
Jan. 11	I. L. Collier	34.76	9,100	June 14	C. G. Paulsen	35.14	10,900
Feb. 26	J. T. Hartson	33.41	5,820	July 22	.....do	35.40	12,300
27	.....do	33.32	5,440	Sept. 8	.....do	32.77	4,780
				14	.....do	32.30	3,570

Daily discharge, in second-feet, of Skagit River near Sedro Woolley, Wash., for the year ending Sept. 30, 1915.

Day.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.
1	7,770	13,000	15,600	6,760	5,570	5,570	9,340	11,000	14,200	11,000	10,400	7,280
2	7,770	35,900	14,900	9,670	6,020	5,570	34,300	10,400	13,800	13,100	10,400	7,020
3	8,070	38,300	13,800	10,000	5,790	5,360	57,600	10,000	12,800	13,800	11,000	6,260
4	7,480	29,500	13,100	10,000	5,790	5,570	41,700	10,400	11,700	14,500	9,670	6,760
5	6,910	33,300	11,700	8,410	5,790	6,020	28,100	11,000	13,100	14,200	8,710	7,020
6	6,370	30,000	10,700	7,550	7,280	5,790	22,600	12,400	15,600	12,800	8,410	6,260
7	6,110	23,000	10,400	7,280	7,550	5,790	20,000	14,200	17,600	12,400	9,020	5,360
8	6,110	19,200	10,000	7,550	6,760	5,570	19,600	16,800	15,600	10,400	8,710	4,560
9	6,110	20,400	9,340	7,830	6,510	5,570	16,800	16,000	13,100	12,400	8,410	4,750
10	6,110	18,400	9,020	7,280	7,020	5,570	14,900	17,600	11,400	10,000	8,410	4,370
11	7,190	17,600	8,410	9,020	6,510	5,570	14,500	16,400	10,700	9,020	9,020	4,190
12	7,190	21,700	7,830	11,000	6,260	5,570	15,200	13,800	10,400	7,550	8,710	4,020
13	10,600	20,000	7,550	9,340	6,260	5,360	17,200	13,100	10,400	7,830	7,830	3,860
14	8,990	20,000	7,280	8,410	6,020	6,020	17,600	12,400	10,700	7,830	8,710	3,860
15	8,070	16,800	7,280	8,410	5,790	16,800	14,500	12,800	11,000	7,550	9,670	3,710
16	7,770	14,900	7,020	7,280	5,360	16,800	14,500	11,000	12,400	11,700	9,340	3,860
17	10,600	13,400	6,760	7,020	5,360	12,400	16,800	10,400	13,100	11,000	9,670	3,710
18	16,900	12,400	6,510	6,510	7,280	11,700	18,400	11,000	11,700	9,340	9,020	3,860
19	28,500	11,000	6,260	6,510	6,510	11,400	19,200	13,100	10,700	8,410	8,410	3,860
20	21,800	14,900	6,260	6,510	6,260	8,410	20,000	14,200	10,000	9,020	9,340	3,860
21	15,100	20,800	6,260	6,510	5,790	8,710	18,000	13,400	9,670	10,000	10,000	3,860
22	12,000	17,600	6,020	6,260	5,790	11,000	15,200	12,800	9,670	11,700	10,700	3,860
23	9,940	17,600	5,790	6,020	5,790	14,500	13,400	12,400	10,700	10,400	11,000	3,860
24	8,990	17,600	5,790	6,020	5,570	14,500	12,800	11,700	11,400	9,670	10,000	4,020
25	8,680	17,600	5,360	5,790	6,020	13,100	12,400	12,800	11,000	10,000	10,000	3,860
26	8,370	20,800	5,570	5,790	5,790	10,700	12,000	11,700	9,670	10,000	9,020	3,420
27	8,070	23,900	5,570	5,570	5,570	9,670	12,400	11,000	8,710	9,670	8,710	3,420
28	7,770	21,700	5,570	5,360	5,570	8,710	11,700	23,500	8,410	9,020	8,410	2,960
29	7,480	19,600	5,570	5,360	....	9,020	11,700	20,800	8,410	9,020	8,120	2,740
30	7,480	17,600	5,570	5,150	....	10,400	12,800	15,600	9,670	8,710	9,020	2,740
31	13,300	....	7,020	5,150	....	10,000	....	13,100	....	10,000	8,710	......

NOTE.—Discharge ascertained as follows: Oct. 1 to Nov. 3, from rating curve fairly well defined between 5,000 and 40,000 second-feet; Nov. 4 to Sept. 25, from rating curve well defined between 3,000 and 20,000 second-feet; Sept. 26–30, from rating curve well defined between 3,500 and 18,000 second-feet. Gage heights Sept. 8–25 slightly doubtful, as water was standing in pools at gage; determinations of discharge based on measurements Sept. 8 and 14 and corrections to gage heights found applicable on those dates.

Monthly discharge of Skagit River near Sedro Woolley, Wash., for the year ending Sept. 30, 1915.

[Drainage area, 2,930 square miles.]

Month.	Discharge in second-feet.				Run-off.		Accuracy.
	Maximum.	Minimum.	Mean.	Per square mile.	Depth in inches on drainage area.	Total in acre-feet.	
October	28,500	6,110	9,790	3.34	3.85	602,000	B.
November	38,300	11,000	20,600	7.03	7.84	1,230,000	B.
December	15,600	5,360	8,190	2.80	3.23	504,000	A.
January	11,000	5,150	7,270	2.48	2.86	447,000	A.
February	7,550	5,360	6,130	2.09	2.18	340,000	A.
March	16,800	5,360	8,930	3.05	3.52	549,000	A.
April	57,600	9,340	18,800	6.42	7.16	1,120,000	A.
May	23,500	10,000	13,400	4.57	5.27	824,000	A.
June	17,600	8,410	11,600	3.96	4.42	690,000	A.
July	14,500	7,550	10,400	3.55	4.09	640,000	A.
August	11,000	7,830	9,240	3.15	3.63	568,000	A.
September	7,280	2,740	4,440	1.52	1.70	264,000	B.
The year	57,600	2,740	10,700	3.65	49.75	7,780,000	

STETATTLE CREEK NEAR MARBLEMOUNT, WASH.

Location.—In sec. 6, T. 37 N., R. 13 E. Willamette meridian (unsurveyed), above Skagit trail bridge, a quarter of a mile above mouth, and 22½ miles by trail northeast of Marblemount, in Whatcom County; below all tributaries.

Drainage area.—Not measured.

Records available.—December 19, 1913, to November 14, 1915.

Gage.—Vertical staff on left bank, 600 feet above Skagit trail bridge; read to hundredths once each day, for which record is published, by Henry Soll.

Discharge measurements.—Made from cable or by wading.

Channel and control.—One channel at all stages. Banks not subject to overflow. Control, 75 feet below gage, composed of large boulders; probably permanent. Stage of zero flow, gage height −0.2 foot ±0.2 foot, as determined February 20, 1915.

Extremes of discharge.—Maximum stage recorded, October 1, 1914, to November 14, 1915, 4.50 feet at 4.40 p. m. April 2 (discharge, 1,470 second-feet); minimum stage recorded, 1.02 feet January 28–29 (discharge, 26 second-feet).

1913–1915: Maximum stage recorded, 5.4 feet at 8 a. m. January 6, 1914 (discharge, 1,800 second-feet); minimum stage recorded 1.01 feet at 8 a. m. February 11–12, 1914 (discharge, 23.6 second-feet).

Winter flow.—Stage-discharge relation not seriously affected by ice; open-channel rating curve assumed applicable.

Diversions.—None.

Regulation.—None.

Accuracy.—Considerable diurnal fluctuation April to June. Results good, but record is too fragmentary for monthly estimates, except December to April.

Discharge measurements of Stetattle Creek near Marblemount, Wash., during the year ending Sept. 30, 1915.

Date.	Made by—	Gage height.	Discharge.	Date.	Made by—	Gage height.	Discharge.
		Feet.	*Sec.-ft.*			*Feet.*	*Sec.-ft.*
Feb. 20	J. T. Hartson	1.35	47.8	July 20	C. G. Paulsen	1.95	130
20	.....do	1.35	47.3	Sept. 10	.....do	1.21	35.0

Daily discharge, in second-feet, of Stetattle Creek near Marblemount, Wash., from Oct. 7, 1914, to Nov. 14, 1915.

Day.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.
1914-15.												
1		945	250	33	33	43	523	86			122	
2			190	36	28	43	1,470	75	137		119	
3		428	140	60	29	42	602	137	182		114	64
4		945	110	44	30	57	305	158	288		114	63
5			80	41	35	53	254	238	305		89	
6		254	63	36	44	51	224				102	
7	48		60	36	41	50	209				75	
8		224	55	37	27	49	196				86	44
9			51	39	46	50	123		128			
10	63		47	41	48	52	130				97	36
11		270	44	50	44	51	160		128		89	34
12			44	70	42	49	240		209		94	32
13			45	51	42	46	209		148		96	30
14		148	45	44	40	126	158			121	102	
15			40	42	36	238	137			238	100	30
16		100	34	36	36	182	384		158	148	89	31
17			34	35	52	158	238		182	119		
18		78	34	35	55	148	270		121	117	88	44
19	288		33	34	50	123	288					
20			33	34	46	137	209		132	128		
21			32	32	44	182	163			137		
22		182	31	31	42	238	117	158		119		
23			30	30	41	224	119	132	170	119		
24			29	30	41	158	148	133	148	119	89	
25	89		30	30	46	123	158	126	102	119	79	
26			30	28	44	102	137	116		110		
27			30	28	42	121	117	305		114		
28			30	26	44	92	170	288		86		
29			30	26		110	182	170		130		
30			30	27		114	134	126		133		
31			30	30		82		170		117		

Day.	Oct.	Nov.	Day.	Oct.	Nov.	Day.	Oct.	Nov.
1915.			1915.			1915.		
1		451	11	57	68	21	137	
2		238	12	63	69	22	126	
3		209	13	305		23	119	
4		254	14	109	54	24	428	
5		209	15	75		25	123	
6	44		16	53		26	523	
7	41	121	17	57		27	498	
8	38	100	18	324		28	575	
9	36		19	343		29	324	
10	34	76	20	575		30	196	
						31	815	

NOTE.—Discharge ascertained from a rating curve well defined between 30 and 600 second-feet. Discharge estimated, for lack of gage readings, by hydrographic comparison with record of Skagit River at Reflector Bar, near Marblemount, Dec. 1-5 and Apr. 10-12.

Monthly discharge of Stetattle Creek near Marblemount, Wash., for the period Dec. 1, 1914 to Apr. 30, 1915.

Month.	Discharge in second-feet.			Run-off (total in acre-feet).	Accuracy.
	Maximum.	Minimum.	Mean.		
December	250	29	56.9	3,500	C.
January	70	26	37.2	2,290	A.
February	55	28	41.0	2,280	A.
March	238	42	106	6,520	A.
April	1,470	117	259	15,400	B.
The period				30,000	

SAUK RIVER AT DARRINGTON, WASH.

Location.—In the SE. ¼ sec. 24, T. 32 N., R. 9 E., 700 feet above suspension footbridge half a mile southeast of Darrington, in Snohomish County, 2½ miles below Clear Creek, and 23 miles above its mouth.

Drainage area.—293 square miles (measured on topographic maps).

Records available.—June 15, 1914, to September 30, 1915.

Gage.—Vertical staff on left bank, attached to log crib, 700 feet above suspension bridge; read once daily to half tenths by Paul Schmidt.

Discharge measurements.—Made from suspension bridge or by wading.

Channel and control.—Channel composed of gravel and large boulders, practically permanent; left bank high and not subject to overflow; right bank flat and subject to overflow at extremely high stages. Stage of zero flow, gage height of −1.7 feet, ±0. 5 foot, as determined September 7, 1915.

Extremes of discharge.—Maximum stage recorded during year and the period 1914–15, 8.47 feet at 4.30 p. m. April 2 (discharge, 20,400 second-feet); minimum stage recorded, 0.78 foot September 28–29, 1915 (discharge, 340 second-feet).

Winter flow.—Stage-discharge relation not affected by ice.

Regulation.—None.

Accuracy.—Results excellent except for periods of extremely high and low water. Diurnal fluctuation practically negligible.

Discharge measurements of Sauk River at Darrington, Wash., during 1913–1915.

Date.	Made by—	Gage height.	Discharge.	Date.	Made by—	Gage height.	Discharge.
		Feet.	*Sec.-ft.*			*Feet.*	*Sec.-ft.*
1913.				1913.			
Oct. 26	James E. Stewart	2.78	1,420	Mar. 2	J. T. Hartson	1.41	585
				Apr. 15	.....do	3.09	1,660
1914.				16	.....do	3.25	1,780
May 12	G. L. Parker	4.02	2,760	June 13	C. G. Paulsen	2.46	1,160
Sept. 25	I. L. Collier	2.39	1,110	Sept. 6	.....do	1.07	402
				7	.....do	1.02	389
1915.							
Mar. 1	J. T. Hartson	1.42	599				

Daily discharge, in second-feet, of Sauk River at Darrington, Wash., from June 15, 1914, to Sept. 30, 1915.

Day.	June.	July.	Aug.	Sept.	Day.	June.	July.	Aug.	Sept.
1914.					1914.				
1	....	4,420	1,180	564	16	4,540	1,890	850	850
2	....	4,160	1,110	534	17	4,100	1,780	850	975
3	....	3,670	1,110	501	18	3,670	1,690	740	1,420
4	....	2,870	1,110	470	19	3,360	1,600	850	3,240
5	....	2,540	1,180	487	20	3,050	1,520	850	3,240
6	....	2,120	1,110	504	21	3,450	1,430	790	2,120
7	....	2,390	975	521	22	2,250	1,340	740	1,420
8	....	2,250	975	538	23	2,400	1,260	690	1,260
9	....	2,250	910	555	24	2,540	1,420	740	1,110
10	....	2,390	850	572	25	2,390	1,340	690	1,110
11	....	2,540	975	618	26	2,250	1,180	690	1,500
12	....	2,540	975	530	27	2,180	1,180	690	1,420
13	....	2,390	975	490	28	2,120	1,110	740	1,110
14	....	1,890	975	490	29	2,870	1,010	690	975
15	4,970	1,890	910	572	30	3,670	1,180	648	975
					31	....	1,180	595	....

Daily discharge, in second-feet, of Sauk River at Darrington, Wash., from June 15, 1914, to Sept. 30, 1915—Continued.

Day.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.
1914–15.												
1	850	5,560	1,680	1,340	910	550	4,690	1,180	1,590	1,340	1,110	550
2	975	9,460	1,590	1,340	740	550	20,600	1,180	1,420	1,420	1,110	520
3	1,110	11,600	1,420	975	690	530	11,100	1,180	1,260	1,420	910	490
4	975	11,600	1,260	910	640	690	5,260	1,180	1,420	1,260	690	640
5	850	7,210	1,260	790	850	640	3,050	1,260	1,780	1,260	975	510
6	740	3,910	1,110	740	975	595	2,540	1,590	2,250	1,110	850	418
7	740	3,050	975	690	910	595	2,870	1,780	1,780	1,260	740	400
8	740	2,700	975	740	910	572	2,250	1,780	1,420	1,260	790	640
9	690	2,700	910	740	910	572	1,890	2,000	1,260	975	740	530
10	1,110	2,250	850	975	850	572	1,680	2,000	1,110	790	850	452
11	1,500	4,160	790	1,340	790	550	1,780	1,780	1,040	740	790	418
12	2,000	3,670	740	1,040	740	530	2,120	1,590	1,040	740	850	409
13	1,420	3,910	740	910	690	975	2,540	1,420	1,110	850	850	400
14	1,110	3,910	740	790	640	2,250	1,780	1,420	1,110	740	860	385
15	1,040	2,120	690	740	595	3,450	1,680	1,260	1,260	1,040	850	435
16	1,110	1,890	640	690	595	1,890	1,890	1,110	1,260	1,340	850	470
17	2,120	1,590	640	640	975	1,500	2,250	1,260	1,180	1,110	740	452
18	5,560	1,420	640	640	850	1,680	2,250	1,420	1,110	790	740	435
19	4,970	1,590	618	640	740	1,340	2,120	1,590	975	910	910	435
20	2,870	4,160	618	640	640	1,260	2,000	1,420	975	1,040	910	435
21	2,120	2,870	618	640	640	1,340	1,780	1,340	1,040	1,260	1,040	435
22	1,780	2,390	595	595	640	1,680	1,590	1,260	1,110	975	1,040	435
23	1,500	2,700	572	595	640	1,890	1,420	1,180	1,260	850	975	510
24	1,340	2,250	550	572	640	1,780	1,420	1,340	1,110	975	850	435
25	1,260	2,700	550	550	690	1,420	1,420	1,420	975	975	690	435
26	1,260	3,910	572	530	640	1,260	1,420	1,260	850	850	740	385
27	1,110	2,700	595	510	595	1,110	1,420	1,590	850	850	850	370
28	1,110	2,540	640	510	572	1,180	1,420	2,870	850	850	740	340
29	1,110	2,250	618	510	....	1,340	1,500	2,000	975	790	850	340
30	1,890	1,890	850	510	....	1,340	1,260	1,590	1,110	850	740	370
31	1,680	....	1,040	572	....	1,180	....	1,590	....	910	530	....

NOTE.—Discharge ascertained from a rating curve well defined between 500 and 5,000 second-feet. Discharge June 16, 17, 19, 23, 27, July 15, 18–21, Sept. 1–3, and 5–9, 1914, and Sept. 2, 1915, interpolated; that for Sept. 4, 1914, computed from an estimated gage height during period when water had receded from gage.

Monthly discharge of Sauk River at Darrington, Wash., for the years ending Sept. 30, 1914–15.

[Drainage area, 293 square miles.]

Month.	Discharge in second-feet.				Run-off.		Accuracy.
	Maximum.	Minimum.	Mean.	Per square mile.	Depth in inches on drainage area.	Total in acre-feet.	
1914.							
June 15–30	4,970	2,120	3,110	10.6	6.31	98,700	A.
July	4,420	1,040	2,010	6.86	7.91	124,000	A.
August	1,180	595	876	2.99	3.45	53,900	A.
September	3,240	470	1,020	3.48	3.88	60,700	A.
The period	....	....	....	....	....	337,000	
1914–15.							
October	5,560	690	1,570	5.36	6.18	96,500	A.
November	11,600	1,420	3,820	13.0	14.50	227,000	B.
December	1,680	550	841	2.87	3.31	51,700	A.
January	1,340	510	755	2.58	2.97	46,400	A.
February	975	572	739	2.52	2.62	41,000	A.
March	3,450	530	1,190	4.06	4.68	73,200	A.
April	20,600	1,260	3,030	10.3	11.49	180,000	B.
May	2,870	1,110	1,510	5.15	5.94	92,800	A.
June	2,250	850	1,220	4.16	4.64	72,600	A.
July	1,420	740	1,020	3.48	4.01	62,700	A.
August	1,110	530	844	2.88	3.32	51,900	A.
September	640	340	449	1.53	1.71	26,700	B.
The year	20,600	340	1,410	4.81	65.37	1,020,000	

BAKER LAKE NEAR CONCRETE, WASH.

Location.—At United States fish hatchery at Baker Lake, 14 miles northeast of Concrete, in Whatcom County.

Drainage area.—Not measured.

Records available.—October 2, 1910, to October 31, 1915, when station was discontinued.

Gage.—Vertical staff fastened to pile at boathouse: read to tenths daily by C. D. Ryan.

Extremes of stage.—Maximum stage recorded during October 1, 1914, to October 31, 1915, 10.9 feet, October 27, 1915; minimum stage recorded, 1.5 feet September 9–11.

1910–1915: Maximum stage recorded, 14.0 feet January 6, 1914; minimum stage recorded, 0.6 foot February 3–28, 1914.

Winter flow.—Ice occasionally forms on lake.

Regulation.—None.

Cooperation.—Record furnished by the United States Bureau of Fisheries.

Daily gage height, in feet, of Baker Lake near Concrete, Wash., for the period Oct. 1, 1914, to Oct. 31, 1915.

Day.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.
1	5.0	8.0	4.0	2.2	1.9	2.0	3.9	3.1	5.5	4.2	3.6	2.2	2.0
2	4.5	10.0	3.8	2.4	1.9	2.0	10.0	3.0	5.0	4.4	3.7	2.1	1.9
3	4.0	8.8	3.5	2.5	1.9	2.0	10.5	2.7	4.4	4.5	3.7	2.0	1.9
4	3.8	8.0	3.0	2.7	1.9	2.0	7.0	2.6	3.9	4.5	3.7	1.9	1.9
5	3.6	7.0	3.0	2.9	1.9	2.0	5.0	2.5	4.0	4.4	3.6	1.9	2.2
6	3.5	7.0	3.0	3.0	1.9	2.1	4.0	2.5	4.5	4.1	3.5	1.9	2.4
7	3.4	6.8	3.0	3.5	2.0	2.1	4.3	2.5	5.0	3.8	3.2	1.9	2.8
8	3.3	7.0	3.0	3.4	2.2	2.1	4.5	3.0	4.0	3.5	3.0	1.8	3.0
9	3.3	7.5	2.8	3.2	2.3	2.1	4.5	3.5	......	3.8	2.8	1.5	3.5
10	3.3	8.0	2.7	3.0	2.3	2.1	4.5	3.8	......	3.2	2.6	1.5	4.0
11	3.4	8.0	2.5	3.0	2.3	2.1	4.3	4.0	......	3.0	2.6	1.5	4.1
12	5.0	7.0	2.3	3.0	2.2	2.1	4.1	4.2	......	2.8	2.6	1.6	4.1
13	4.8	6.0	2.1	3.0	2.4	2.1	3.8	4.2	......	2.8	2.6	1.7	4.0
14	4.5	6.0	2.0	2.9	2.3	3.0	3.5	4.2	......	2.9	2.6	1.7	4.0
15	4.3	5.6	1.9	2.8	2.3	5.0	3.5	4.4	......	3.1	2.4	1.7	3.9
16	4.5	5.0	1.9	2.8	2.3	4.5	3.5	......	3.9	4.2	2.3	1.7	3.8
17	5.0	5.0	1.8	2.8	2.5	4.2	3.5	......	3.8	3.5	2.1	1.7	3.5
18	6.0	5.0	1.7	2.8	2.7	4.0	3.9	......	3.5	3.2	2.0	1.7	3.4
19	7.5	4.5	1.7	2.8	3.0	3.8	4.3	......	3.3	3.3	2.0	1.9	3.6
20	7.0	4.3	1.7	2.8	3.0	3.6	4.8	4.5	......	3.4	2.0	1.9	3.8
21	7.0	3.0	1.7	2.8	2.8	4.0	4.5	4.0	3.3	3.7	2.0	1.9	4.0
22	6.5	3.8	1.7	2.8	2.7	4.5	4.3	3.8	3.4	3.7	2.0	1.9	4.5
23	5.0	4.0	1.7	2.8	2.5	5.0	4.0	3.5	3.8	3.5	2.0	1.9	6.0
24	5.0	4.5	1.7	2.0	2.3	5.0	3.8	3.4	3.6	3.5	2.0	1.9	5.5
25	5.0	5.0	1.7	2.0	2.3	4.5	3.5	3.2	3.2	3.5	2.0	1.9	6.0
26	4.9	5.2	1.7	1.9	2.3	4.3	3.5	3.0	3.0	3.5	2.1	1.9	7.5
27	4.7	5.5	1.7	1.9	2.2	4.0	3.5	3.0	3.2	3.5	2.3	2.0	10.9
28	4.5	5.4	1.8	1.9	2.0	3.7	3.5	3.0	3.5	3.5	2.3	2.2	9.0
29	4.5	4.8	1.8	1.9	......	3.5	3.5	3.0	3.9	3.5	2.3	2.0	7.3
30	6.0	4.5	1.9	1.9	......	4.0	3.5	4.0	4.0	3.5	2.3	2.0	5.0
31	6.5	......	2.0	1.9	......	4.2	......	6.0	......	3.4	2.3	......	5.2

Note.—Mean height for year ending Sept. 30, 1915, 3.44 feet.

BAKER RIVER BELOW ANDERSON CREEK, NEAR CONCRETE, WASH.

Location.—In the SE. ¼ sec. 30, T. 37 N., R. 9 E., 350 feet below Anderson Creek, one-fourth mile above the Baker River ranger station, and 11 miles above Concrete, in Skagit County.

Drainage area.—184 square miles (measured on topographic maps).

Records available.—September 10, 1910, to September 30, 1915.

Gage.—Since September 24, 1915, Stevens water-stage recorder on left bank, 350 feet below Anderson Creek. From September 10 to November 19, 1910, vertical staff at trail bridge one-eighth mile above Anderson Creek. Readings on this gage have been reduced to datum of gage installed October 22, 1910, by means of a relation curve. October 22, 1910, to September 4, 1913, vertical and inclined staff gage on left bank, 30 feet above present gage. September 21, 1913, to September 23, 1915, an inclined and two vertical sections at practically the same site as gages previously used but at different datum. Water-stage recorder is referred to datum of the staff gage last used, but the slight change in location materially affected the rating.

Discharge measurements.—Made from a cable 300 feet above the gage.

Channel and control.—Stream bed composed of boulders and gravel over bedrock; not likely to shift except during extreme floods. Right bank high and rocky; left bank fairly high and wooded, subject to overflow at about gage height 11 feet.

Extremes of discharge.—Maximum stage recorded during year, 9.6 feet at 5 p. m. April 2 (discharge, 17,700 second-feet); minimum stage recorded, 2.63 feet at 5 p. m. January 29 (discharge, 554 second-feet).

1910–1915: Maximum stage recorded 12.6 feet[1] 3 p. m. January 6, 1914 (discharge, 30,200 second-feet); minimum stage recorded, 2.6 feet February 27 and March 1, 1911 (discharge, 410 second-feet).

Winter flow.—Stage-discharge relation not affected by ice.

Accuracy.—Results good. Considerable diurnal fluctuation June to September. Frequent gaps in gage-height record.

Cooperation.—Gage-height record furnished by United States Forest Service.

Discharge measurements of Baker River below Anderson Creek, near Concrete, Wash., during the year ending Sept. 30, 1915.

Date.	Made by—	Gage height.	Discharge.	Date.	Made by—	Gage height.	Discharge.
		Feet.	*Sec.-ft.*			*Feet.*	*Sec.-ft.*
Jan. 7	I. L. Collier	3.24	924	June 16	C. G. Paulsen	4.46	1,880
8	.....do	3.56	1,150	July 17	Parker and Paulsen	4.18	1,560
Feb. 24	J. T. Hartson	3.03	786	18	Paulsen and Parker	3.97	1,400
25	.....do	3.15	814	Sept. 13	C. G. Paulsen	2.72	584
June 15	C. G. Paulsen	4.42	1,820	24	.....do	3.02	735

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[1] Gage height 11.1 feet used for computing discharge, 1.5 feet being difference between gage readings by observer at 12.0 feet, and stage determined from gage rated by meter measurements; supersedes maximum published in Water-Supply Paper 392.

Daily discharge, in second-feet, of Baker River below Anderson Creek, near Concrete, Wash., for the year ending Sept. 30, 1915.

Day.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.
1	1,270	8,120	1,520	1,040	910	730	5,180	1,120	2,370	2,500	1,710	1,420
2	1,350	6,260	1,400	1,740	780	676	17,200	1,160	2,130	2,640	1,620	1,480
3	1,270	4,700	1,280	1,530	780	676	14,300	1,190	1,910	2,640	1,520	1,550
4	1,220	5,440	1,160	1,190	780	847	4,480	1,520	2,250	2,500	1,440	1,620
5	1,180	3,900	1,040	975	785	804	2,950	1,910	2,960	2,250	1,810	1,040
6	1,180	2,370	1,040	910	1,040	762	2,370	2,200	2,660	2,130	1,810	847
7	1,090	2,250	1,040	847	910	719	2,500	2,500	2,370	2,020	1,620	847
8	1,040	2,250	944	1,120	847	676	2,020	2,370	1,910	2,130	1,620	847
9	997	2,640	847	975	1,040	676	1,620	2,250	1,520	1,810	1,350	847
10	953	2,130	787	975	975	730	1,520	2,500	1,620	1,440	1,710	730
11	910	3,480	730	1,440	926	676	2,010	1,910	1,520	1,270	1,620	676
12	2,950	2,370	730	1,270	877	676	2,500	1,910	1,520	1,270	1,520	730
13	1,710	2,250	676	1,040	828	676	2,370	1,620	1,520	1,190	1,810	601
14	1,510	2,250	676	975	779	1,990	1,910	1,810	1,810	1,190	1,910	577
15	1,510	1,620	676	910	730	3,300	1,910	1,620	1,810	1,710	1,860	625
16	1,730	1,350	650	787	730	2,130	2,250	1,440	1,910	1,810	1,810	787
17	3,300	1,350	650	730	1,190	1,710	2,130	1,440	1,810	1,620	1,810	910
18	3,950	1,440	625	730	1,040	1,710	2,790	1,910	1,710	1,520	1,440	1,040
19	4,700	1,440	601	730	975	1,440	2,640	2,130	1,440	1,810	2,250	847
20	3,120	2,020	601	730	910	1,710	2,130	2,130	1,490	2,020	2,500	910
21	2,130	2,370	589	676	847	1,810	1,810	1,900	1,550	1,960	2,250	910
22	1,820	2,020	577	676	787	1,910	1,440	1,670	1,600	1,910	2,500	910
23	1,520	2,250	554	676	730	2,250	1,440	1,440	1,660	2,350	2,250	910
24	1,440	2,790	554	625	730	1,910	1,350	1,710	1,710	2,790	2,130	852
25	1,440	2,520	554	601	847	1,520	1,350	1,710	1,440	1,810	2,020	825
26	1,440	3,300	554	577	730	1,270	1,440	2,500	1,350	1,810	1,910	745
27	1,440	2,640	577	577	730	1,230	1,350	3,300	1,270	1,810	2,020	695
28	1,350	2,500	577	577	730	1,190	1,440	4,480	1,190	1,710	1,820	670
29	1,350	2,130	577	554	....	1,350	1,440	2,250	1,810	1,710	1,620	670
30	3,860	1,710	625	554	....	1,350	1,270	1,910	2,250	1,710	1,480	670
31	1,450	....	676	676	....	1,270	....	2,250	....	1,810	1,350	....

NOTE.—Discharge ascertained as follows: Oct. 1 to Sept. 23, from a rating curve well defined between 700 and 8,000 second-feet, applicable to readings on staff gage; Sept. 23 to 30, from a rating curve well defined throughout, applicable to readings from water-stage recorder; Mar. 5–7, 14, 27, Apr. 11, May 2, 6, 15, 21, 22, 26, June 6, 17, 20–23, 27, July 21, 23, Aug. 1, 2, 11, 28, 30, Sept. 1–3, and 7–8, by interpolation. Discharge estimated by hydrographic comparison with record of Baker River at Concrete, Oct. 4–7, 9–10, 14–16, 18, 22, 25, 31, Nov. 5, 14, 25, Dec. 2–4, 8, 14, 21, Jan. 2–3, 30, Feb. 1–5, 11–14, 28.

Monthly discharge of Baker River below Anderson Creek, Concrete, Wash., for the year ending Sept. 30, 1915.

[Drainage area, 184 square miles.]

Month.	Discharge in second-feet.				Run-off.		Accuracy.
	Maximum.	Minimum.	Mean.	Per square mile.	Depth in inches on drainage area.	Total in acre-feet.	
October	4,700	910	1,810	9.84	11.34	111,000	B.
November	8,120	1,350	2,800	15.2	16.96	167,000	B.
December	1,520	554	777	4.22	4.86	47,800	B.
January	1,740	554	884	4.80	5.53	54,400	B.
February	1,190	730	856	4.65	4.84	47,500	B.
March	3,300	676	1,300	7.07	8.15	79,900	B.
April	17,200	1,270	3,040	16.5	18.41	181,000	B.
May	4,480	1,120	1,990	10.8	12.45	122,000	B.
June	2,950	1,190	1,800	9.78	10.91	107,000	B.
July	2,790	1,190	1,900	10.3	11.87	117,000	B.
August	2,500	1,350	1,810	9.84	11.34	111,000	B.
September	1,620	597	893	4.85	5.41	53,100	B.
The year	17,200	554	1,660	9.02	122.07	1,200,000	

BAKER RIVER AT CONCRETE, WASH.

Location.—In the NW. ¼ sec. 11, T. 35 N., R. 8 E., at highway bridge at Concrete, in Skagit County, one-fourth mile above mouth.

Drainage area.—270 square miles (measured on topographic map).

Records available.—September 11, 1910, to March 4, 1915, when station was discontinued.

Gage.—Inclined and vertical staff on left bank, 150 feet below the bridge; read once daily to hundredths by Isaac Kvarno.

Discharge measurements.—Made from highway bridge or from cable 300 feet above the bridge.

Channel and control.—Loose sand, gravel, and small boulders; shifting frequently. Banks high; not subject to overflow. One channel at all stages.

Extremes of discharge.—Maximum stage recorded October 1, 1914, to March 4, 1915, 6.4 feet at 1.30 p. m. November 1 (discharge, 8,950 second-feet); minimum stage recorded, 1.67 feet at 1.30 p. m. December 24 (discharge, 652 second-feet).

1910–1915: Maximum stage recorded, 11.5 feet at 1 p. m. January 6, 1914 (discharge, 24,500 second-feet), observer failed to get peak about 6 p. m. (discharge about 31,000 second-feet); minimum stage recorded, 2.18 feet at 1 p. m. January 22–23, 1913 (discharge, 634 second-feet).

Winter flow.—Stage-discharge relation not affected by ice.

Regulation.—Natural storage in Baker Lake.

Accuracy.—Results good. Conditions for measurement fair. Diurnal fluctuation small.

Discharge measurements of Baker River at Concrete, Wash., during the period Oct. 1, 1914, to Mar. 4, 1915.

Date.	Made by—	Gage height.	Discharge.
		Feet.	*Sec.-ft.*
Jan. 9	I. L. Collier	2.61	1,580
Feb. 22	J. T. Hartson	2.18	1,060
23	....do	2.10	983

Daily discharge, in second-feet, of Baker River at Concrete, Wash., for the year ending Sept. 30, 1915.

Day.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Day.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.
1	1,560	8,950	2,380	1,260	1,170	910	16	2,010	1,780	830	1,170	910	......
2	1,890	6,990	1,780	2,130	894	870	17	3,890	1,670	750	1,080	1,560	......
3	1,560	5,150	1,670	2,010	910	838	18	5,150	1,360	750	1,080	1,360	......
4	1,360	6,430	1,560	1,560	910	1,170	19	6,430	1,670	712	990	1,260	......
5	1,260	5,150	1,460	1,460	910	......	20	4,070	2,780	675	960	1,080	......
6	1,260	3,710	1,360	1,460	990	......	21	2,780	2,640	675	910	1,080	......
7	1,260	2,780	1,260	1,460	1,080	......	22	2,250	2,640	675	870	1,040	......
8	1,170	2,640	1,260	1,670	1,080	......	23	1,890	2,510	675	830	990	......
9	1,260	3,220	1,170	1,460	1,360	......	24	1,780	2,510	652	830	910	......
10	1,260	2,510	1,170	1,560	1,260	......	25	1,670	2,640	701	790	990	......
11	1,260	2,780	1,080	1,890	1,260	......	26	1,670	3,380	750	750	960	......
12	3,380	2,510	990	1,890	1,170	......	27	1,670	3,220	750	750	910	......
13	2,250	3,070	910	1,890	1,040	......	28	1,670	3,070	750	750	910	......
14	1,780	3,070	830	2,130	990	......	29	1,560	3,070	750	750	......	......
15	1,780	1,780	830	1,780	910	......	30	3,070	2,250	750	720	......	......
							31	2,010	......	830	790	......	......

Note.—Discharge ascertained from a rating curve well defined between 900 and 3,000 second-feet. Dec. 25, gage not read; discharge interpolated.

Monthly discharge of Baker River at Concrete, Wash., for the period Oct. 1, 1914, to Mar. 4, 1915.

[Drainage area, 270 square miles.]

Month.	Discharge in second-feet.				Run-off.		Accuracy.
	Maximum.	Minimum.	Mean.	Per square mile.	Depth in inches on drainage area.	Total in acre-feet.	
October	6,430	1,170	2,190	8.11	9.35	135,000	B.
November	8,950	1,360	3,260	12.1	13.50	194,000	B.
December	2,380	652	1,010	3.74	4.31	62,100	B.
January	2,130	720	1,280	4.74	5.46	78,700	B.
February	1,560	894	1,070	3.96	4.12	59,400	B.
March 1-4	1,170	838	947	3.51	.52	7,510	B.
The period						537,000	

UPPER COLUMBIA RIVER BASIN.

KOOTENAI RIVER AT LIBBY, MONT.

Location.—In sec. 3, T. 30 N., R. 31 W., at highway bridge opposite Great Northern Railway station at Libby, in Lincoln County.

Drainage area.—11,000 square miles.

Records available.—October 13, 1910, to September 30, 1915.

Gage.—Chain gage in left span of highway bridge; prior to completion of bridge a temporary staff gage fastened to an old stump, on the right bank at the lower side of the bridge. In February, 1913, gage datum was lowered 2 feet; all readings prior to change reduced to new datum.

Discharge measurements.—Made from bridge; before erection of bridge, from ferry cable.

Channel and control.—Channel permanent; broken by two piers. Bed of stream composed of small rocks; current fairly swift and uniformly distributed.

Extremes of discharge.—Maximum stage recorded during year, 9.2 feet June 27–28 (discharge, 34,000 second-feet); minimum discharge, January 26, 1915, estimated at 2,500 second-feet.

1910–1915: Maximum stage recorded, 14.3 feet June 4, 1913 (discharge, 77,300 second-feet); minimum stage recorded, 1.4 feet February 7, 1914 (discharge, 1,690 second-feet).

Winter flow.—Stage-discharge relation seriously affected by ice. Flow estimated from records of precipitation and temperature and hydrographic comparison with other streams.

Diversions.—None of importance.

Accuracy.—Results excellent except for periods in which stage-discharge relation was affected by ice.

Cooperation.—Gage-height record furnished by United States Forest Service.

No discharge measurements made during the year.

Daily discharge, in second-feet, of Kootenai River at Libby, Mont., for the year ending Sept. 30, 1915.

Day.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.
1	8,570	8,130	6,280	....	2,530	2,730	4,530	16,800	19,800	28,800	15,900	8,920
2	8,230	8,570	5,970	....	2,620	2,780	4,800	20,800	19,200	27,600	15,900	8,570
3	8,230	12,800	5,970	....	2,970	2,620	5,370	21,900	20,300	27,000	15,900	8,230
4	8,400	12,000	5,670	....	3,060	2,620	6,590	20,300	20,300	24,700	15,400	7,890
5	8,570	11,600	5,670	....	3,060	2,650	6,910	18,700	19,800	28,800	15,000	7,560
6	8,230	12,000	5,370	....	3,000	2,680	7,230	17,300	20,800	24,900	14,600	7,560
7	7,890	12,400	5,370	....	3,060	2,650	7,560	16,800	20,300	23,000	13,700	7,560
8	7,560	11,200	4,800	4,000	2,890	2,730	7,560	17,300	20,800	23,000	12,800	7,560
9	7,560	10,000	5,080	3,700	2,840	2,650	7,230	20,800	21,300	22,400	12,800	7,560
10	7,560	9,280	3,780	3,420	2,940	2,650	7,230	24,100	20,800	21,300	12,400	7,560
11	7,560	8,920	3,550	3,660	2,940	2,620	7,230	27,600	19,200	20,300	12,400	7,280
12	7,560	9,280	3,780	3,550	2,840	2,680	7,230	26,400	17,300	19,800	12,000	6,910
13	7,560	9,650	....	3,230	2,890	2,780	8,230	24,100	15,900	17,800	11,600	6,910
14	7,560	9,650	....	3,360	2,730	2,920	9,650	21,900	15,900	16,800	11,200	6,590
15	7,560	8,570	....	3,360	2,580	3,060	10,400	21,900	16,400	16,800	11,200	6,590
16	7,560	8,230	....	3,280	2,620	3,330	11,200	20,800	17,800	17,800	11,200	6,280
17	7,890	6,590	....	3,140	2,530	3,550	12,400	19,800	18,200	19,800	10,800	6,280
18	8,570	6,280	....	3,000	2,650	3,550	14,600	17,800	19,800	20,800	10,800	5,970
19	8,570	6,280	....	3,000	2,780	3,780	17,300	17,300	20,800	20,800	10,400	5,970
20	9,280	6,910	....	3,120	2,840	3,780	19,800	16,400	20,600	20,300	10,400	5,970
21	9,650	6,910	....	3,060	2,810	4,020	20,800	16,400	20,300	19,800	10,400	5,970
22	9,280	6,910	....	2,840	2,650	4,020	19,800	15,900	19,800	18,700	10,200	5,970
23	8,570	6,910	....	2,620	2,730	4,530	17,800	16,400	19,800	18,700	10,000	5,970
24	7,890	6,910	....	2,730	2,840	5,080	15,900	17,800	19,800	18,200	10,000	5,970
25	7,720	6,910	....	2,620	2,620	5,370	14,100	18,700	20,300	18,200	10,000	6,280
26	7,560	6,910	....	2,500	2,650	5,080	13,700	16,400	22,400	16,800	9,650	6,280
27	7,560	6,910	....	2,650	2,780	4,800	13,300	18,700	34,000	16,800	9,280	6,280
28	7,230	6,910	....	2,650	2,760	4,530	13,700	18,200	34,000	16,800	9,280	6,280
29	7,230	6,910	....	2,680	....	4,530	13,300	18,700	30,100	17,300	9,280	6,280
30	7,230	6,590	....	2,650	....	4,530	14,600	19,800	28,800	17,800	8,920	6,280
31	7,680	....	....	2,580	....	4,530	....	20,300	....	17,300	8,920	......

NOTE.—Discharge Oct. 1 to Dec. 12, and Mar. 16 to Sept. 30, determined from a rating curve well defined between 3,400 and 25,000 second-feet, and fairly well defined above 25,000 second-feet. Discharge relation affected by ice Dec. 13 to Jan. 7; discharge estimated as follows, from climatic records and by comparison of hydrographs, November to March, for this station and the stations on Clark Fork at St. Regis, and near Plains, and on Flathead River near Polson Dec. 13-20, 3,500 second-feet; Dec. 21-25, 3,800 second-feet; Dec. 26 to Jan. 7, 4,000 second-feet. Discharge Jan. 8 to Mar. 15 determined from readings on lower gage, where discharge relation was not affected by ice, by means of curve of relation obtained during open water. Discharge interpolated, for lack of gage readings, Oct. 4, 25, 31; Nov. 1, 8, 26; June 20, July 6, Aug. 22, and Sept. 19.

Monthly discharge of Kootenai River at Libby, Mont., for the year ending Sept. 30, 1915.

Month.	Discharge in second-feet.			Run-off (total in acre-feet).	Accuracy.
	Maximum.	Minimum.	Mean.		
October	9,650	7,230	8,060	492,000	A.
November	12,800	6,280	8,570	510,000	A.
December	6,280	....	4,270	263,000	D.
January	....	2,500	3,270	201,000	C.
February	3,060	2,530	2,790	155,000	C.
March	5,370	2,620	3,540	218,000	B.
April	20,800	4,530	11,300	672,000	A.
May	27,600	15,900	19,600	1,210,000	A.
June	34,000	15,900	21,200	1,260,000	A.
July	28,800	16,800	20,600	1,270,000	A.
August	15,900	8,920	11,700	719,000	A.
September	8,920	5,970	6,840	407,000	A.
The year	34,000	....	10,200	7,380,000	

CALLAHAN CREEK AT TROY, MONT.

Location.—In sec. 13, T. 31 N., R. 34 W., at highway bridge one-fourth mile southeast of Troy, in Lincoln County.

Drainage area.—Not measured.

Records available.—June 11, 1911, to September 30, 1915.

Gage.—Vertical staff attached to the right abutment of bridge; read at irregular intervals by H. L. Baker, an employee of the United States Forest Service. On May 24, 1913, gage was washed out and not replaced until October 12, 1913, when datum was lowered 1.60 feet to avoid minus-sign readings.

Discharge measurements.—Made by wading or from bridge.

Channel and control.—Bed of stream composed of small rocks and gravel; may shift at high stages. Banks are low but not subject to overflow.

Extremes of discharge.—Maximum stage recorded during year, 2.30 feet at 10 a. m. April 17; minimum stage recorded, 0.30 foot October 2, 1914, August 20 and 27, September 7, 14, and 25, 1915.

1911–1915: Maximum stage recorded, 3.7 feet May 9 and 15, 1912 (discharge, 1,300 second-feet); minimum discharge, October 29–31, 1911, estimated at 12 second-feet. Records fragmentary.

Winter flow.—Stage-discharge relation seriously affected by ice; observations discontinued during winter.

Diversions.—None.

Regulation.—None.

Cooperation.—Gage-height record furnished by United States Forest Service.

No discharge measurements made during the year, and sufficient measurements have not been obtained to develop a rating curve.

Daily gage height, in feet, of Callahan Creek near Troy, Mont., for the year ending Sept. 30, 1915.

Day.	Oct.	Nov.	Jan.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.
1	0.35				1.40				0.45	
2	.30	1.10								
3					1.90		1.80	0.80		
4										
5							1.25			
6		1.90						.80		
7								.75	.35	0.30
8							1.10			
9		1.60			1.65	1.80	1.15			
10		1.55				1.90		.75		
11							1.00			
12						1.80		.70		
13	.50							.70		
14							.90			.30
15								65		
16	.45	1.30				1.55				
17					2.29	1.60				
18							.80			
19							.75		.30	
20										
21							.70	.60		
22	.55									
23	.85							.50		
24										
25				1.45			.65			.30
26										
27	.75					1.40	1.20	.50	.30	
28						1.55				
29							1.00	.50		
30			1.30							.30
31										

YAAK RIVER NEAR TROY, MONT.

Location.—Near north line of T. 32 N., R. 34 W., at highway bridge near mouth of the stream, about 10 miles northwest of Troy.

Drainage area.—Not measured.

Records available.—March 2, 1914, to September 30, 1915, at present site; October 15, 1910, to May 6, 1912, staff gage on right bank half a mile above Yaak Falls, near south line of sec. 33, T. 34 N., R. 33 W.; May 8, 1912, to June 17, 1912, staff gage at Fritz Lang's ranch near Sylvanite, 4 miles upstream; June 18, 1912, to March 2, 1914, staff gage 300 feet farther downstream and at a different datum.

Gage.—Vertical staff on downstream side of left abutment at highway bridge; read occasionally by R. E. Clay.

Discharge measurements.—Made from bridge.

Channel and control.—Gravel and boulders; probably permanent.

Extremes of discharge.—1910–1915: Maximum stage recorded, 3.69 feet May 15, 1912 (discharge 4,240 second-feet); minimum stage recorded, 2.88 feet March 22, 1913 (discharge, 193 second-feet). Discharge not ascertained in 1914–15.

Winter flow.—Stage-discharge relation seriously affected by ice. Record discontinued.

Diversions.—None.

No discharge measurements made during the year. Data insufficient for estimates of discharge.

Daily gage height, in feet, of Yaak River near Troy, Mont., for the year ending Sept. 30, 1915.

Date.	Gage height.	Date.	Gage height.	Date.	Gage height.
Oct. 1	1.4	Oct. 24	1.6	Apr. 14	3.5
3	1.45	Dec. 1	1.85	15	3.0
5	1.55	5	1.7	22	2.95
15	1.9	Feb. 26	1.3	23	2.8
20	1.8	Mar. 30	1.9	24	2.7
21	1.75	Apr. 4	2.7	Aug. 15	1.3

MOYIE RIVER AT SNYDER, IDAHO.

Location.—In sec. 23, T. 64 N., R. 2 E. Boise meridian, at Snyder ranger station, a quarter of a mile west of Snyder station on Spokane & International Railway, 3½ miles below Round Prairie Creek, 12 miles above mouth, in Bonner County.

Drainage area.—717 square miles (revised; measured on Cranbrook sheet of British Columbia map and on map of Priest Lake quadrangle).

Records available.—February 21, 1912, to September 30, 1915, at present location. From March 10, 1911, to February 20, 1912, at railway bridge 1 mile downstream.

Gage.—Since February 21, 1912, vertical and inclined staff on left bank, 150 feet west of Snyder ranger station; read to hundredths twice daily by J. E. Ryan. From March 10, 1911, to February 20, 1912, vertical staff attached to left abutment of railway bridge 1 mile below present gage.

Discharge measurements.—Made by wading at gage or from highway bridge a quarter of a mile downstream.

Channel and control.—Stream bed composed of small boulders and gravel with steep gradient; straight above and below gage. Banks high and not subject to overflow. Riffle control 500 feet below gage; shifting at high stages.

Extremes of discharge.—Maximum stage recorded during year, 6.2 feet at 6 p. m. April 19 (discharge, 2,700 second-feet); minimum stage recorded, 3.00 feet, February 20–21 (discharge, 100 second-feet).

1911–1915: Maximum stage recorded, 9.3 feet May 31 and June 1–2, 1913 (discharge, 8,020 second-feet); minimum stage recorded, 2.90 feet March 9–10, 12–13, 1912 (discharge, 91 second-feet).

Winter flow.—Stage-discharge relation seriously affected by ice. Flow estimated from current-meter measurements, observer's notes, and records of precipitation and temperature.

Accuracy.—Observer's record reliable, but frequent gaps occur due to his absence. When ice is not present and when record is continuous, results are good. When stage-discharge relation is affected by ice, results are poor.

Cooperation.—Gage-height record furnished by the United States Forest Service.

Discharge measurements of Moyie River at Snyder, Idaho, during the year ending Sept. 30, 1915.

[Made by C. O. Brown.]

Date.	Gage height.	Discharge.
	Feet.	*Sec.-ft.*
May 14	5.38	1,700
15	5.90	2,280

Daily discharge, in second-feet, of Moyie River at Snyder, Idaho, for the year ending Sept. 30, 1915.

Day.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.
1	154	386	412	187	154	125	440	1,860	1,440	665	310	120
2	167	740	359	187	154	127	595	1,970	1,340	665	310	120
3	170	900	359	187	154	129	900	1,970	1,340	665	288	120
4	187	900	359	187	148	131	1,070	1,750	1,160	665	288	120
5	191	1,030	359	187	125	133	1,030	1,750	1,160	630	265	120
6	187	1,160	310	187	125	134	1,030	1,750	1,160	595	265	120
7	187	985	310	183	125	136	985	1,640	1,160	562	244	120
8	187	900	288	178	125	138	985	1,750	1,160	530	244	120
9	187	860	224	174	125	140	942	1,750	1,070	530	244	120
10	187	860	217	170	125	140	900	1,750	985	530	224	125
11	187	820	206	170	125	140	900	1,750	985	530	217	154
12	187	780	198	170	125	140	1,160	1,750	942	530	206	154
13	187	740	194	170	125	154	1,540	1,750	820	530	187	154
14	174	740	187	164	120	154	1,750	1,750	801	469	187	154
15	154	665	180	164	112	161	1,750	2,320	782	412	187	154
16	154	630	167	164	125	187	1,750	2,200	764	440	187	140
17	170	595	161	154	140	232	1,970	2,090	745	440	170	140
18	217	595	154	154	140	244	2,440	1,980	726	440	170	125
19	232	595	161	154	131	265	2,570	1,860	708	440	154	125
20	261	562	161	154	100	265	2,200	1,860	689	412	154	125
21	265	530	161	140	100	265	2,080	1,860	670	412	154	125
22	265	500	164	140	120	288	1,970	1,860	651	386	148	125
23	265	469	164	140	125	359	1,860	1,860	632	359	148	125
24	265	469	164	140	125	595	1,750	1,860	614	359	146	140
25	265	469	164	140	125	562	1,540	1,750	595	334	144	140
26	265	440	170	140	125	440	1,540	1,750	740	334	142	140
27	257	412	174	140	125	440	1,540	1,750	900	334	140	154
28	257	412	174	148	125	440	1,540	1,640	900	334	140	161
29	257	412	180	157	......	440	1,540	1,640	740	359	140	161
30	261	412	187	154	......	440	1,540	1,540	665	346	125	170
31	265	......	187	154	......	440	......	1,540	......	334	125	......

Note.—Discharge ascertained as follows: Oct. 1–Sept. 30, from a rating curve fairly well defined between 200 and 3,000 second-feet. Oct. 9–11, Jan. 7–9, Mar. 2–8, and 29–31, May 16–18, June 14–24, July 1–3, 9, and 30, Aug. 24–26, Sept. 4, gage not read, discharge interpolated. Discharge estimated, because of ice, from observer's notes and records of precipitation and temperature, Dec. 10 to Jan. 3, and Jan. 28–30.

Monthly discharge of Moyie River at Snyder, Idaho, for the year ending Sept. 30, 1915.

[Drainage area, 717 square miles.]

Month.	Discharge in second-feet.				Run-off.		Accuracy.
	Maximum.	Minimum.	Mean.	Per square mile.	Depth in inches on drainage area.	Total in acre-feet.	
October	265	154	213	0.297	0.34	13,100	B.
November	1,160	386	666	.929	1.04	39,600	B.
December	412	....	221	.308	.36	13,600	C.
January	187	140	163	.227	.26	10,000	C.
February	154	100	128	.179	.19	7,110	B.
March	595	125	258	.360	.42	15,900	C.
April	2,570	440	1,460	2.04	2.28	86,900	B.
May	2,320	1,540	1,820	2.54	2.93	112,000	B.
June	1,440	595	901	1.26	1.41	53,600	C.
July	665	334	470	.656	.76	28,900	B.
August	310	125	195	.272	.31	12,000	B.
September	170	120	136	.190	.21	8,090	B.
The year	2,570	....	553	.771	10.51	401,000	

CLARK FORK AT ST. REGIS, MONT.

LOCATION.—In sec. 19, T. 18 N., R. 27 W., at McLeod's ferry at St. Regis, Mineral County, about half a mile below mouth of St. Regis River.

DRAINAGE AREA.—Not measured.

RECORDS AVAILABLE.—October 26, 1910, to September 30, 1915.

GAGE.—Vertical staff in four sections on left bank at old ferry landing; read once a day by Archie McLeod.

DISCHARGE MEASUREMENTS.—Made from ferry cable at gage.

CHANNEL AND CONTROL.—Channel permanent both above and below the station. Banks are high and not subject to overflow.

EXTREMES OF DISCHARGE.—Maximum stage recorded during year, 10.0 feet June 21 (discharge, 17,300 second-feet); minimum stage recorded, 3.3 feet February 3 (discharge, 2,780 second-feet).

1910–1915: Maximum stage recorded, 19.1 feet May 30–31, 1913 (discharge, 62,800 second-feet); minimum stage recorded, 2.9 feet January 4, 1912 (discharge, 1,710 second-feet).

WINTER FLOW.—Stage-discharge relation not seriously affected by ice except during short periods in extremely cold weather.

DIVERSIONS.—Water diverted from several of the tributaries to irrigate lands in the vicinity of Missoula in Bitterroot Valley.

REGULATION.—None.

ACCURACY.—Results excellent except when stage-discharge relation was affected by ice.

No discharge measurements made during 1914–15.

Daily discharge, in second-feet, of Clark Fork at St. Regis, Mont., for the year ending Sept. 30, 1915.

Day.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.
1	3,100	4,610	4,230	3,100	2,240	2,780	3,800	9,450	12,300	11,100	6,340	3,100
2	3,100	4,610	4,060	3,100	2,410	2,700	3,890	9,970	12,600	10,500	6,340	2,980
3	3,100	5,030	3,550	3,230	2,200	2,700	4,230	9,700	13,800	9,970	6,340	3,380
4	3,100	5,900	3,720	2,880	2,780	2,780	4,610	9,450	13,500	9,700	5,900	3,720
5	3,380	5,680	3,720	2,880	2,880	2,980	5,240	8,950	14,200	9,200	5,680	3,890
6	3,890	5,240	3,550	3,100	2,880	2,700	5,460	8,450	15,600	8,950	5,240	3,720
7	3,720	4,420	3,230	2,980	2,780	2,700	5,460	7,960	16,600	8,700	5,030	3,550
8	3,720	4,230	2,980	2,780	2,780	2,700	5,460	7,720	16,600	8,950	4,820	3,380
9	3,550	4,230	2,780	2,620	2,700	2,700	5,460	7,720	15,900	10,200	4,820	3,550
10	3,720	4,610	2,700	2,780	2,780	2,700	5,240	8,200	15,200	10,800	4,610	3,550
11	3,720	5,030	2,700	2,700	2,780	2,620	5,460	8,700	14,500	11,400	4,420	3,720
12	3,550	5,240	2,550	2,550	2,980	2,780	5,680	9,200	14,500	10,800	4,230	3,890
13	3,720	6,120	2,550	2,620	2,700	2,700	5,900	8,950	15,900	9,700	4,060	4,060
14	3,720	6,120	2,480	2,550	2,780	2,780	6,340	8,950	17,000	9,200	4,060	4,230
15	3,720	5,680	2,480	2,550	2,780	2,780	6,780	9,450	16,600	9,200	4,060	4,230
16	3,720	5,680	2,410	2,620	2,700	3,100	7,000	10,200	16,200	9,200	3,890	4,230
17	4,060	5,460	2,480	2,550	2,700	2,780	7,240	9,700	16,600	8,950	3,890	4,060
18	4,230	5,460	2,480	2,480	2,700	3,230	7,720	9,450	17,000	9,200	4,060	4,060
19	4,820	5,240	2,480	2,480	2,700	3,380	8,700	10,200	16,600	9,450	3,890	3,890
20	5,030	5,030	2,620	2,480	2,700	3,550	9,450	12,000	17,000	8,950	3,890	3,890
21	5,030	4,820	2,620	2,410	2,780	3,550	9,970	12,900	17,300	8,200	3,890	3,890
22	5,240	4,610	2,780	2,410	2,780	3,550	10,500	13,500	16,200	7,720	3,720	3,720
23	5,240	4,610	2,880	2,350	2,780	3,380	10,200	14,200	14,800	7,240	3,720	3,720
24	5,030	4,420	2,980	2,240	2,700	4,060	9,450	13,800	13,500	6,780	3,720	3,550
25	4,820	4,420	2,880	2,290	2,780	4,420	8,700	13,500	12,900	6,560	3,550	3,550
26	4,820	4,420	2,980	2,350	2,700	4,230	8,200	13,200	13,500	6,340	3,380	3,720
27	4,610	4,420	3,100	2,240	2,700	3,890	8,200	12,900	15,200	5,900	3,320	3,890
28	4,610	4,420	3,100	2,290	2,700	3,550	8,200	12,600	14,500	5,900	3,230	3,890
29	4,610	4,420	3,100	2,240	....	3,550	8,450	12,300	12,900	6,120	3,230	4,060
30	4,420	4,230	3,100	2,200	....	3,550	8,950	12,600	11,700	6,560	3,100	4,060
31	4,420	....	3,100	2,240	....	3,890	....	12,600	....	6,560	3,100	......

NOTE.—Discharge ascertained from a well-defined rating curve. Stage-discharge relation probably somewhat affected by ice Dec. 8, 9, 13, 14, and 17.

Monthly discharge of Clark Fork at St. Regis, Mont., for the year ending Sept. 30, 1915.

Month.	Discharge in second-feet.			Run-off (total in acre-feet).	Accuracy.
	Maximum.	Minimum.	Mean.		
October	5,240	3,100	4,110	253,000	A.
November	6,120	4,230	4,950	295,000	A.
December	4,230	2,410	2,980	183,000	B.
January	3,230	2,200	2,590	159,000	B.
February	2,980	2,200	2,710	151,000	C.
March	4,420	2,620	3,190	196,000	C.
April	10,500	3,890	7,000	417,000	B.
May	14,200	7,720	10,600	652,000	A.
June	17,300	11,700	15,000	893,000	A.
July	11,400	5,900	8,650	532,000	A.
August	6,340	3,100	4,300	264,000	A.
September	4,230	2,980	3,770	224,000	A.
The year	17,300	2,220	5,830	4,220,000	

CLARK FORK NEAR PLAINS, MONT.

LOCATION.—In lot 7, sec. 1, T. 19 N., R. 26 W., at Cooper's ferry, 2½ miles above Plains, in Sanders County, and 6 miles below mouth of Flathead River.

DRAINAGE AREA.—19,900 square miles.

RECORDS AVAILABLE.—October 28, 1910, to September 30, 1915.

GAGE.—Barrett & Lawrence water-stage recorder installed November 28, 1911, 50 feet below an overhanging chain gage on right bank, 150 feet below the point where the old ferry crossed. Datum is that of chain gage which was read before the installation of the recorder.

Discharge measurements.—Made from highway bridge at Plains, 2½ miles below gage. The station was rated by measurements from a ferry cable 150 feet above the gage. This cable has since been removed.

Channel and control.—River is deep; current only moderately swift even at flood stages. Banks are fairly high and not subject to overflow. No definite point of control; channel practically permanent.

Extremes of discharge.—Maximum stage during year from water-stage recorder, 9.76 feet at 11 p. m. June 7 (discharge, 37,900 second-feet); minimum stage from recorder, 4.0 feet March 10–17 (discharge, 6, 850 second-feet).

1910–1915: Maximum stage recorded, 17.9 feet June 5, 1913 (discharge, 115,000 second-feet); minimum stage recorded, 3.6 feet March 9–10, 1912 (discharge, 5,290 second-feet).

Winter flow.—Stage-discharge relation slightly affected by ice. Open-channel rating curve usually applicable, but during coldest weather the discharge is ascertained from gage heights at Thompson, Mont.

Diversions.—A number of small ditches take water for irrigation from tributaries of Flathead River and headwaters of Clark Fork.

Regulation.—Flathead Lake furnishes a natural but uncontrolled regulation.

Accuracy.—Results excellent except for winter months and periods when gage at Plains was not read.

No discharge measurements were made during the year.

Daily discharge, in second-feet, of Clark Fork near Plains, Mont., for the year ending Sept. 30, 1915.

Day.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.
1	8,420	11,100	11,900	9,100	8,050	7,090	7,860	27,100	32,800	32,800	18,800	10,400
2	8,420	11,100	11,900	8,950	7,900	7,090	7,860	27,100	32,800	32,100	18,800	10,400
3	8,420	11,500	11,900	8,950	7,900	7,090	8,130	27,100	34,400	32,100	18,800	10,700
4	8,420	13,200	11,900	8,650	7,900	7,090	8,130	27,800	34,400	31,400	17,700	10,700
5	8,420	13,600	11,500	7,900	8,050	7,090	8,420	27,100	34,400	30,600	17,100	10,400
6	8,420	13,600	11,500	7,750	7,500	70,90	9,030	27,100	35,900	29,900	16,600	10,000
7	8,420	13,600	10,700	8,500	7,200	7,090	9,030	27,100	37,400	29,200	17,100	10,000
8	8,720	13,600	10,000	8,500	7,100	7,090	9,030	26,400	37,400	29,200	16,600	9,680
9	8,420	13,600	9,680	8,500	7,500	7,090	9,030	26,400	37,400	29,900	16,600	10,000
10	8,420	13,600	9,350	8,050	7,500	6,850	9,030	27,800	35,900	30,600	16,600	10,000
11	8,420	14,100	8,720	7,300	7,300	6,850	9,350	29,200	35,900	30,600	16,000	10,000
12	8,720	14,600	8,130	7,900	7,300	6,850	10,100	29,200	35,900	29,900	15,500	9,680
13	8,420	15,500	7,860	7,750	7,200	6,850	11,900	29,900	35,900	28,500	15,500	9,680
14	8,420	16,600	8,420	7,750	7,100	6,850	13,200	30,600	37,400	27,100	15,000	9,680
15	8,130	16,000	7,860	7,750	7,500	6,850	14,600	31,400	36,700	27,100	15,500	9,350
16	8,720	16,600	7,860	7,750	7,300	6,850	15,500	32,100	36,700	27,100	15,000	9,680
17	9,350	16,600	8,420	7,750	7,100	6,850	16,000	32,100	36,700	27,800	15,000	9,680
18	10,000	15,500	8,130	7,300	7,200	7,090	16,600	32,100	36,700	27,800	15,000	9,680
19	11,100	15,500	8,130	7,900	7,200	7,090	18,200	32,800	36,700	26,400	15,500	9,680
20	11,100	15,000	8,420	7,300	7,100	7,340	20,000	34,400	36,700	25,100	12,700	9,680
21	11,500	15,000	8,720	7,400	7,100	7,340	21,800	35,900	37,400	23,800	12,700	10,000
22	11,500	14,600	8,720	7,500	7,200	7,340	23,100	35,900	36,700	23,100	11,900	9,680
23	11,900	14,600	9,350	7,200	7,100	7,340	23,800	35,900	34,400	22,500	11,900	9,680
24	11,900	14,600	9,680	7,500	7,200	7,600	23,800	35,900	33,600	22,500	10,700	9,680
25	11,900	14,100	9,030	7,900	7,100	7,600	23,100	35,100	32,800	21,800	10,400	9,680
26	11,500	14,100	9,030	8,500	7,100	7,600	23,100	34,400	32,800	20,600	10,400	9,680
27	11,500	13,600	9,680	7,900	7,100	7,600	23,100	34,400	34,400	20,600	10,400	10,000
28	11,500	13,600	10,000	7,750	7,090	7,340	23,100	33,600	34,400	21,200	10,700	10,400
29	11,500	13,600	9,680	7,750	....	7,340	23,800	32,800	33,600	21,200	10,700	10,400
30	11,500	13,200	9,350	8,500	....	7,600	24,400	33,600	32,800	20,600	10,700	10,400
31	11,500	....	9,250	7,900	....	7,600	....	33,600	....	19,400	10,400	....

Note.—Discharge ascertained from gage heights at Plains and a well-defined rating curve except as follows: Nov. 1–30 and Apr. 13–30, water-stage recorder at Plains out of order; gage heights for the station obtained from lower gage at Thompson by means of a relation curve developed for the two gages. Dec. 31 to Feb. 27, stage-discharge relation probably affected by ice; discharge ascertained from gage heights and a fairly well-defined rating curve for the station at Thompson. Discharge interpolated, for lack of gage readings, Apr. 12 and Aug. 19–20.

Monthly discharge of Clark Fork near Plains, Mont., for the year ending Sept. 30, 1915.

Month.	Discharge in second-feet.			Run-off (total in acre-feet).	Accuracy.
	Maximum.	Minimum.	Mean.		
October	11,900	8,130	9,830	604,000	A.
November	16,600	11,100	14,200	845,000	B.
December	11,900	7,860	9,510	585,000	A.
January	9,100	7,200	7,970	490,000	B.
February	8,050	7,090	7,350	408,000	B.
March	7,600	6,850	7,180	441,000	B.
April	24,400	7,860	15,500	922,000	B.
May	35,900	26,400	31,200	1,920,000	A.
June	37,400	32,800	35,400	2,110,000	A.
July	32,800	19,400	26,500	1,630,000	A.
August	18,800	10,400	14,400	885,000	A.
September	10,700	9,350	9,960	593,000	A.
The year	37,400	6,850	15,800	11,400,000	

PEND OREILLE LAKE AT SANDPOINT, IDAHO.

Location.—In sec. 23, T. 57 N., R. 2 W. Boise meridian, on west side of lake, at municipal wharf at Sandpoint, in Bonner County.

Drainage area. 23,100 square miles (measured on General Land Office maps).

Records available.—March 18, 1914, to September 30, 1915.

Gage.—Vertical staff in two sections on pile at municipal wharf; read to half-tenths by J. A. Fitzwater, W. M. Laybourn, Miss V. L. Chattin, and Miss Alice Small.

Extremes of stage.—Maximum stage recorded during the year, 12.05 feet June 5–21; minimum stage recorded, 5.05 feet March 3–13.

1914–15: Maximum stage recorded, 17.5 feet May 28–29, and June 6, 7, 1914; minimum stage recorded March 3–13, 1915.

Winter flow.—Lake frozen over. Record discontinued.

Diversions.—Considerable diversions from tributaries of Clear Fork for irrigation.

Regulation.—None.

Cooperation.—Record furnished by United States Forest Service.

Daily gage height, in feet, of Pend Oreille Lake at Sandpoint, Idaho, for the year ending Sept. 30, 1915.

Day.	Oct.	Nov.	Dec.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.
1	5.6				5.1	5.8	9.6	11.95	11.6	9.4	6.7
2					5.1	5.8		12.0	11.55	9.35	
3	5.6				5.05	5.85	9.8	12.0	11.5		6.6
4	5.6				5.05	5.95	9.9	12.0	11.4		6.55
5	5.6				5.05	6.1	9.95	12.05	11.3		
6	5.6				5.05		10.05	12.05		8.95	6.45
7	5.6				5.05		10.15	12.05	11.05	8.95	6.4
8					5.05		10.25	12.05	11.0	8.7	6.35
9		7.1			5.05		10.35	12.05	10.98	8.65	6.33
10	5.7		6.6		5.05	6.5	10.4	12.05	10.95	8.6	
11		7.2			5.05	6.6	10.45	12.05	10.85	8.5	6.2
12	5.8	7.2			5.05	6.7	10.5	12.05	10.8	8.4	
13		7.3	6.6		5.05	6.85		12.05	10.75	8.3	6.15
14						6.9		12.05	10.7	8.2	6.10
15					5.1	7.05	10.8	12.05	10.65	8.1	6.11
16					5.15	7.2	10.9	12.05	10.6	8.0	6.12
17					5.2	7.35	11.0	12.05	10.57	7.9	6.12
18		7.5			5.2	7.6	11.05	12.05	10.55	7.8	6.13
19		7.6			5.25	7.8	11.15	12.05	10.5	7.7	
20					5.3	8.0	11.25	12.05	10.4		6.00
21		7.7				8.15	11.35	12.05		7.5	6.00
22					5.3	8.3	11.45		10.25	7.4	5.98
23						8.6	11.5	11.95	10.2	7.35	5.98
24						8.8	11.6		10.15	7.3	5.97
25						8.8		11.85	10.0		5.98
26	6.2			5.1		9.0	11.8	11.8	9.9	7.15	
27		7.7		5.1	5.6	9.1	11.9		9.8		6.00
28				5.1		9.25	11.9	11.75	9.7	7.0	6.00
29					5.65	9.3	11.95	11.7	9.6		5.95
30					5.7			11.65	9.55	6.85	5.95
31					5.75				9.5	6.8	

CLARK FORK AT METALINE FALLS, WASH.

Location.—In the E. ½ sec. 21, T. 39 N., R. 43 E. Willamette meridian, just below Sullivan Creek, 500 feet above Metaline Falls, opposite the town of Metaline Falls, 11 miles above the international boundary, in Pend Oreille County. Elevation of water surface at medium low stage, 1,970 feet above sea level.

Drainage area.—25,600 square miles (measured on General Land Office maps).

Records available.—November 4, 1908, to September 4, 1910 (gage heights only, data inadequate for determination of discharge); October 1, 1912, to September 30, 1915.

Gage.—Vertical and inclined staff, in five sections, 0 to 54 feet, installed February 12, 1914, on right bank 50 feet below Sullivan Creek. Gages previously used as follows: November 4, 1908, to September 4, 1910, vertical staff in two sections, reading from −10 to +32 feet, on right bank, three-fourths mile above present gage; relation of datum to present gage uncertain but probably 8.35 feet higher; October 1 to December 27, 1912, vertical staff at present location but with datum 7.07 feet higher than that of present gage; January 16, 1913, to January 24, 1914, vertical staff at same location but with datum 5 feet higher than that of present gage; January 25 to February 2, 1914, temporary gage set by observer at different datum than previous gage but readings were reported to a datum 5.00 feet higher than present gage datum. All readings October 1, 1912, to February 2, 1914, have been reduced to datum of present gage. Gage read once a day to tenths by J. H. Lambright, October 1 to August 14, and by W. A. Snure, August 15 to September 30.

Discharge measurements.—Made from a boat or through ice.

Channel and control.—Banks high and not subject to overflow. One channel at all stages. A very sensitive and permanent control is formed by Metaline Falls, where water surface drops 20 feet in a distance of 1,200 feet.

Extremes of discharge.—Maximum stage recorded during year, 19.8 feet May 29 and 30, and June 1 (discharge, 44,000 second-feet); minimum stage recorded, 4.85 feet at 12.30 p. m. January 27 (discharge, 8,760 second-feet).

1912–1915: Maximum stage recorded, 41.2 feet June 16, 1913 (discharge, 139,000 second-feet, revised value); minimum stage recorded, 4.1 feet February 7, 1913 (discharge, 7,720 second-feet).

Winter flow.—Stage-discharge relation not affected by ice.

Diversions.—Numerous small diversions from upper tributaries for irrigation.

Accuracy.—Results excellent.

Cooperation.—Maintained in cooperation with British Columbia Hydrometric Survey. Gage-height record and some discharge measurements furnished by Hugh L. Cooper Co.

Discharge measurements of Clark Fork at Metaline Falls, Wash., during the year ending Sept. 30, 1915.

Date.	Made by—	Gage height.	Discharge.	Date.	Made by—	Gage height.	Discharge.
		Feet.	*Sec.-ft.*			*Feet.*	*Sec.-ft.*
Dec. 4	C. O. Brown	10.59	21,000	June 21	Brown and Kornfeldt	19.29	42,700
4	do	10.59	20,600	Sept. 10	Parker and Richardson	7.67	13,900
Mar. 11	do	5.30	9,730	10	Richardson and Parker	7.65	13,700
June 19	do	19.35	42,600	11	Lacy and Parker	7.68	13,900

Daily discharge, in second-feet, of Clark Fork at Metaline Falls, Wash., for the year ending Sept. 30, 1915.

Day.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.
1	10,800	15,400	21,300	13,700	9,500	9,670	13,900	31,300	44,000	40,400	29,900	16,300
2	10,800	15,700	21,300	13,700	9,850	9,500	14,600	31,800	44,000	40,200	29,400	15,800
3	10,800	15,400	21,100	13,200	10,200	9,500	15,000	33,300	43,400	39,900	29,100	15,600
4	10,800	15,900	20,900	13,000	10,200	9,670	15,000	33,000	43,200	39,900	28,400	15,400
5	10,900	16,800	20,900	12,800	9,670	9,670	15,200	33,000	43,200	39,600	28,200	15,100
6	10,900	17,200	20,400	12,800	9,670	9,500	15,700	33,600	43,200	39,100	28,200	14,700
7	10,800	17,900	20,400	12,800	9,850	9,670	16,100	33,600	42,900	38,600	27,500	14,300
8	10,900	18,400	20,200	12,600	9,850	9,670	16,300	33,600	42,900	38,600	27,000	13,600
9	11,100	18,800	20,000	12,400	9,850	9,670	16,100	31,600	42,600	37,800	26,500	14,000
10	11,300	18,800	19,500	12,200	9,850	9,670	16,800	32,300	42,600	37,200	26,000	14,000
11	11,300	19,300	18,800	11,900	9,670	9,500	17,000	32,600	43,200	36,900	25,500	14,000
12	11,700	19,300	18,400	11,700	9,670	9,500	17,400	32,800	43,200	36,400	25,100	13,600
13	11,900	19,700	17,200	11,500	9,670	9,670	18,100	32,800	43,200	36,400	24,600	13,400
14	12,200	19,700	17,000	11,700	9,500	9,670	18,600	33,800	43,400	36,100	24,100	13,000
15	12,200	20,200	15,400	11,700	9,330	9,850	19,500	36,900	43,200	36,100	23,600	12,800
16	12,400	20,600	14,300	11,300	9,500	10,400	19,500	36,900	42,900	36,100	23,100	12,800
17	12,400	21,300	14,600	11,100	9,670	10,800	20,400	37,500	42,900	35,900	22,900	12,800
18	12,600	21,300	14,800	11,100	9,500	11,100	21,300	38,600	42,900	35,600	21,900	12,800
19	12,800	21,600	15,000	11,100	9,500	10,900	21,800	39,600	42,900	34,800	21,500	12,800
20	13,200	21,800	14,100	11,100	9,500	11,300	23,200	39,600	42,600	34,300	20,700	12,600
21	13,200	21,800	13,000	10,900	9,500	11,700	23,400	39,600	42,600	34,300	20,700	12,600
22	13,500	21,800	12,800	10,800	9,500	11,500	24,600	40,200	42,300	33,800	20,300	12,600
23	13,700	21,800	12,400	10,200	9,670	11,900	25,500	41,000	42,600	33,600	19,800	12,400
24	14,100	21,800	12,600	10,400	9,670	11,900	26,300	41,500	42,600	33,300	19,500	12,400
25	12,800	21,600	12,600	10,600	9,670	12,600	27,000	42,300	42,100	32,800	19,100	12,400
26	13,000	21,800	13,500	10,000	9,670	13,000	28,400	42,900	42,100	32,600	18,600	12,400
27	12,800	21,800	13,200	8,690	9,670	13,200	28,400	42,900	41,800	32,300	18,100	12,400
28	13,000	21,600	12,400	8,840	9,670	13,000	28,900	43,700	41,500	32,000	17,900	12,400
29	15,400	21,600	12,600	9,000	....	13,200	28,900	44,000	41,000	31,100	17,400	12,200
30	17,200	21,300	12,600	9,160	....	13,500	30,800	44,000	40,700	30,800	17,000	12,200
31	18,400	....	13,000	9,330	....	13,200	....	44,000	....	30,300	16,700	....

Note.—Discharge ascertained from rating curve well defined between 9,000 and 80,000 second-feet. Oct, 9–10, gage not read, discharge interpolated.

Monthly discharge of Clark Fork at Metaline Falls, Wash., for the year ending Sept. 30, 1915.

Month.	Discharge in second-feet.			Run-off (total in acre-feet).	Accuracy.
	Maximum.	Minimum.	Mean.		
October	18,400	10,800	12,500	769,000	A.
November	21,800	15,400	19,700	1,170,000	A.
December	21,300	12,400	16,300	1,000,000	A.
January	13,700	8,760	11,300	695,000	A.
February	10,200	9,330	9,680	538,000	A.
March	13,500	9,500	10,900	670,000	A.
April	30,800	13,900	20,800	1,240,000	A.
May	44,000	31,300	37,200	2,290,000	A.
June	44,000	40,700	42,700	2,540,000	A.
July	40,400	30,300	35,700	2,200,000	A.
August	29,900	16,700	23,200	1,430,000	A.
September	16,300	12,200	13,400	797,000	A.
The year	44,000	8,760	21,200	15,300,000	

RACETRACK CREEK NEAR ANACONDA, MONT.

Location.—In sec. 13, T. 6 N., R. 11 W., opposite Racetrack Creek ranger station near Anaconda, in Powell County.

Drainage area.—Not measured.

Records available.—April 25, 1914, to September 30, 1915. From July 11, 1911, to Nov. 9, 1912, station maintained in sec. 15, T. 6 N., R. 11 W., above the falls.

Gage.—Vertical staff on right bank, opposite Racetrack Creek ranger station; read twice a day by W. E. Jackson. From July 11, 1911, to June 17, 1912, vertical staff on left bank, 2 miles above present gage. From June 18 to November 9, 1912, vertical staff on left bank, 300 feet above previous gage and at different datum.

Discharge measurements.—Made by wading.

Channel and control.—Gravel and sand; slightly shifting. Banks high and not subject to overflow.

Extremes of discharge.—Maximum stage recorded during year, 3.40 feet June 19; minimum stage recorded, 1.20 feet March 19.

1911-12 and 1914-15: Maximum stage recorded, 6.8 feet June 10-14, 1912 (discharge, 515 second-feet); minimum stage recorded, 2.85 feet February 22, 24, and 26, 1912 (discharge, 16 second-feet).

Winter flow.—Stage-discharge relation seriously affected by ice; record discontinued during the winter.

Diversions.—One small diversion during the irrigation season.

Regulation.—None.

Cooperation.—Gage-height record furnished by United States Forest Service.

No discharge measurements were made during the year. Data inadequate for determination of discharge.

Daily gage height, in feet, of Racetrack Creek near Anaconda, Mont., for the year ending Sept. 30, 1915.

Day.	Oct.	Nov.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.
1	....	....	....	1.23	....	....	2.68	2.02	1.69
2	....	1.38	....	1.28	....	....	2.68	2.00	1.76
3	....	1.38	....	1.30	....	....	2.68	1.99	1.70
4	1.41	1.38	....	1.30	1.68	....	2.60	1.96	....
5	1.44	1.36	....	1.28	1.64	3.10	2.57	1.96	....
6	1.49	1.34	....	1.29	1.62	2.85	2.72	1.90	....
7	1.48	1.34	....	1.28	1.64	2.84	2.87	1.90	....
8	1.44	1.32	....	1.29	1.68	2.94	2.84	....	....
9	1.42	....	....	....	1.80	2.92	2.94	1.81	1.72
10	1.40	....	....	....	1.90	2.75	2.92	1.80	1.70
11	1.40	....	....	....	1.80	2.88	....	1.80	....
12	1.40	....	....	1.30	1.80	2.84	2.49	1.90	....
13	1.42	....	....	1.36	1.90	2.78	2.50	1.89	....
14	1.47	....	....	1.35	2.20	2.69	2.48	1.90	....
15	1.48	....	1.21	1.32	2.04	....	2.48	....	....
16	1.50	....	1.22	1.35	1.93	2.92	2.50	....	....
17	1.50	....	1.22	....	....	2.98	2.50	....	....
18	1.50	....	1.22	....	....	3.05	2.38	....	....
19	1.49	....	1.20	1.50	....	3.40	2.26	....	....
20	1.50	....	1.22	1.52	2.28	....	2.20	1.80	....
21	1.48	....	1.22	1.59	2.22	....	....	1.81	....
22	1.48	....	1.23	1.50	2.30	....	....	1.80	....
23	1.47	....	1.22	1.46	2.26	....	2.04	1.80	....
24	1.47	1.32	1.26	1.46	2.26	2.92	2.00	1.79	....
25	1.40	1.33	1.27	1.49	2.28	3.19	2.00	1.80	....
26	1.40	1.34	1.30	1.50	2.22	3.20	....	....	....
27	1.40	1.33	1.22	1.59	2.14	....	2.22	....	....
28	1.40	1.32	....	1.65	2.25	....	2.30	....	....
29	1.40	....	1.21	....	2.41	2.64	....	....	....
30	....	....	1.22	....	....	2.68	....	1.69	....
31	....	....	1.22	....	....	....	....	1.68	....

LITTLE BLACKFOOT RIVER NEAR ELLISTON, MONT.

Location.—In the SE. ¼ SE. ¼ sec. 30, T. 9 N., R. 6 W., about 500 feet below the Little Blackfoot ranger station, in the Helena National Forest, about 5 miles southeast of Elliston, in Powell County.

Drainage area.—59 square miles.

Records available.—September 29, 1910, to September 30, 1915.

Gage.—Vertical staff, nailed to tree on left bank, 500 feet below the ranger station; read at irregular intervals by the forest ranger, M. D. Mizner.

Discharge measurements.—Made by wading near gage or from a highway bridge one-fourth mile above gage.

Channel and control.—Gravel and small rocks; clean and probably permanent. Current fairly swift at all stages. Banks are high and not subject to overflow.

Extremes of stage.—Maximum stage recorded during year, 5.0 feet June 8; minimum stage recorded, 1.4 feet October 1–4.

1910–1915: Maximum stage recorded, 5.0 feet May 21–22, 1912; May 28, 1913, and June 8, 1915; minimum stage recorded, 1.08 feet October 1, 1910.

Winter flow.—Stage-discharge relation seriously affected by ice; observations discontinued during winter.

Diversions.—Water is diverted for irrigation about half a mile above ranger station.

Regulation.—None. The melting snow in the mountains causes a small diurnal fluctuation during the spring months.

Cooperation.—Field data furnished by United States Forest Service.

No discharge measurements were made during the year. Data inadequate for determination of discharge.

Daily gage height, in feet, of Little Blackfoot River near Elliston, Mont., for the year ending Sept. 30, 1915.

Day.	Oct.	Nov.	Apr.	May.	June.	July.	Aug.	Sept.
1	1.4	1.9	1.7	3.2		2.7		
2	1.4	1.9		3.2		2.64	2.2	
3	1.4					2.6	2.1	
4	1.4				4.1			
5			1.8		4.8			
6								
7			1.9					
8			2.1		5.0			
9			2.3					
10						2.4		
11	1.42						1.9	1.9
12	1.42				4.0			1.9
13	1.42		2.6		4.0			
14	1.44		2.6					
15	1.46		2.6					
16	1.48		2.5			2.4		
17	1.54		2.5		3.8	2.4		
18	1.6		2.2		3.6			
19	1.8		2.0		3.7			
20	2.1		2.0		3.7			
21	1.9		2.3		3.7			
22	1.9		2.4		3.8			
23	1.9		2.6		3.8			
24	1.9		2.8			2.4		
25	1.9		2.8		3.0	2.5		
26			2.9		2.8			
27			3.0		2.7			2.0
28			3.1		2.7			2.0
29			3.2		2.7			
30			3.2		2.7			
31								

WEST FORK OF BITTERROOT RIVER NEAR DARBY, MONT.

Location.—In sec. 27, T. 2 N., R. 21 W., 500 feet downstream from the Trapper Creek ranger station, half a mile below mouth of Trapper Creek and 10 miles south of Darby, in Ravalli County.

Drainage area.—572 square miles.

Records available.—September 19, 1910, to September 30, 1915.

Gage.—Overhanging chain gage on left bank; read daily by N. E. Wilkerson and C. Matteson, forest rangers.

Discharge measurements.—Made by wading or from cable near gage.

Channel and control.—Small rock; uniform; probably permanent. Banks are high and not subject to overflow.

Extremes of discharge.—Maximum stage recorded during year, 4.3 feet May 22 (discharge, 1,580 second-feet); minimum stage recorded, 1.9 feet March 15 (discharge, 120 second-feet).

1910–1915: Maximum stage recorded, 7.4 feet May 27, 1913 (discharge, 6,420 second-feet); minimum stage recorded, 1.85 feet August 28 to September 7, 1914 (discharge, 106 second-feet).

Winter flow.—Stage-discharge relation seriously affected by ice; observations discontinued during winter months.

Diversions.—None.

Regulation.—None.

Accuracy.—Results fair.

Cooperation.—Field data furnished by United States Forest Service.

No discharge measurements made during the year.

Daily discharge, in second-feet, of West Fork of Bitterroot River near Darby, Mont., for the year ending Sept. 30, 1915.

Day.	Oct.	Nov.	Mar.	Apr.	May.	July.	Aug.	Sept.
1	150	....	....	....	....	975	370	150
2	150	....	....	....	....	938	370	216
3	182	....	....	....	....	975	330	216
4	166	....	....	....	....	926	330	182
5	216	....	....	....	....	878	290	....
6	216	....	....	....	....	830	290	....
7	216	....	....	....	....	900	290	....
8	199	....	....	370	....	938	290	....
9	199	....	....	....	....	975	290	....
10	199	....	....	....	....	830	252	....
11	182	....	....	....	....	798	252	....
12	182	....	....	....	....	765	252	....
13	208	....	....	....	....	765	252	....
14	234	....	....	....	....	700	252	....
15	268	....	120	....	....	640	252	....
16	302	....	....	....	....	580	216	....
17	336	....	....	....	....	580	252	....
18	370	182	....	....	....	520	252	....
19	330	....	....	....	....	520	252	....
20	350	216	....	....	....	492	252	....
21	330	....	....	....	....	465	252	....
22	330	....	150	....	1,580	465	216	....
23	290	....	....	....	....	415	216	....
24	271	....	290	....	1,390	415	216	....
25	262	....	....	....	....	415	216	....
26	252	....	....	....	....	370	216	....
27	....	....	216	....	....	370	216	....
28	....	....	....	....	....	370	182	....
29	....	....	216	....	....	415	182	....
30	....	....	216	....	....	415	150	....
31	....	....	....	....	....	415	150	....

NOTE.—Discharge ascertained from a fairly well-defined rating curve. Discharge interpolated, for lack of gage readings, Oct. 13, 15–17, 25, July 4–5, 8, 11, 20 and 30; mean monthly discharge for July, 647 second-feet, August, 252 second-feet. Monthly run-off in acre-feet for July, 39,800 acre-feet; for August, 15,500 acre-feet.

EAST FORK OF BITTERROOT RIVER NEAR DARBY, MONT.

LOCATION.—In the SE. ¼ sec. 21, T. 2 N., R. 20 W., at Joe Olsen's bridge, in front of the Medicine Tree ranger station, 10 miles from Darby and 3 miles above junction of East and West forks, in Ravalli County.

DRAINAGE AREA.—340 square miles.

RECORDS AVAILABLE.—October 20, 1910, to September 30, 1915 (fragmentary).

GAGE.—Vertical staff on downstream end of left abutment of the bridge; read occasionally by N. E. Wilkerson and C. W. Shockley.

DISCHARGE MEASUREMENTS.—Made by wading or from bridge.

CHANNEL AND CONTROL.—Large rocks; irregular and probably permanent. Banks high and not subject to overflow.

EXTREMES OF DISCHARGE.—Maximum stage recorded during year, 4.4 feet May 24–25 (discharge, 711 second-feet); minimum stage recorded, 2.3 feet March 13 (discharge, 69 second-feet).

1910–1915: Maximum stage recorded, 7.0 feet May 31, 1913 (discharge, 2,230 second-feet); minimum stage recorded, 2.0 feet December 10–11, 1910 (discharge, 50 second-feet).

WINTER FLOW.—Stage-discharge relation seriously affected by ice; observations discontinued during winter.

DIVERSIONS.—None.

REGULATION.—None.

ACCURACY.—Rating curve fairly well defined. Results fair.

COOPERATION.—Field data furnished by United States Forest Service.

The following discharge measurement was made by E. W. Kramer: November 27, 1914: Gage height, 2.50 feet; discharge, 102 second-feet.

Daily discharge, in second-feet, of East Fork of Bitterroot River near Darby, Mont., for the year ending Sept. 30, 1915.

Date.	Discharge.	Date.	Discharge.	Date.	Discharge.
Mar. 2	102	Apr. 14	186	Aug. 4	238
6	85	26	238	10	186
8	69	27	238	13	174
9	85	28	265	16	174
13	69	May 2	292	23	174
15	85	4	320	27	151
22	85	24	711	Sept. 14	174
28	102	25	711	17	102
Apr. 9	120	Aug. 3	265		

NOTE.—Discharge ascertained from a rating curve fairly well defined above 69 second-feet.

LOLO CREEK NEAR LOLO, MONT.

LOCATION.—In sec. 34, T. 12 N., R. 21 W., at the highway bridge at Anderson's ranch, 7 miles upstream from Lolo and the junction with the Bitterroot, in Missoula County.

DRAINAGE AREA.—249 square miles.

RECORDS AVAILABLE.—April 25, 1911, to September 30, 1915, for station at present site. October 18, 1910, to March 9, 1911, gage-height record at station 1 mile below Anderson's ranch. Milk Creek enters between the two stations.

GAGE.—Vertical staff fastened to bridge abutment; read at irregular intervals by A. N. Thayer.

DISCHARGE MEASUREMENTS.—Made by wading from the bridge.

CHANNEL AND CONTROL.—Gravel and boulders; probably permanent.

EXTREMES OF DISCHARGE.—Maximum stage recorded during year, 3.5 feet June 25 (discharge, 840 second-feet); minimum stage recorded, 1.82 feet March 20 (discharge, 60 second-feet).

1911–1915: Maximum stage recorded, 5.2 feet May 28, 1913 (discharge, 2,500 second-feet); minimum stage recorded, 1.64 feet March 20, 1912 (discharge, 36 second-feet).

WINTER FLOW.—Stage-discharge relation seriously affected by ice; observations discontinued during winter.

DIVERSIONS.—Water diverted above station for irrigation on small ranches, below station for irrigation on the land adjoining this creek and Bitterroot River.

REGULATION.—None.

ACCURACY.—Results poor owing to uncertainty of stage-discharge relation and lack of current-meter measurements since 1912 and irregular gage readings.

COOPERATION.—Field data furnished by United States Forest Service.

No discharge measurements made during year.

Daily discharge, in second-feet, of Lolo Creek near Lolo, Mont., for the year ending Sept. 30, 1915.

Day.	Oct.	Nov.	Dec.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.
1	108	183	142	....	196	315	567	479	144	107
2	110	187	135	....	254	315	621	416	140	110
3	112	191	128	....	264	315	675	353	136	113
4	114	195	122	....	274	315	695	290	132	115
5	116	176	122	....	284	315	715	227	128	117
6	119	156	122	....	294	322	701	164	125	119
7	122	153	....	....	304	330	688	156	122	122
8	126	150	....	....	315	338	675	148	117	124
9	130	147	....	....	329	346	638	148	111	126
10	131	145	....	....	343	354	614	162	105	128
11	133	143	....	....	357	362	590	176	99	130
12	135	141	....	....	371	370	566	190	95	130
13	137	139	....	....	385	378	542	204	91	130
14	137	137	....	....	399	387	518	218	88	130
15	137	137	....	....	413	396	494	206	85	130
16	137	137	....	....	427	405	471	195	85	130
17	137	143	....	....	441	414	484	186	86	130
18	141	149	....	....	456	428	497	176	87	126
19	146	156	....	....	471	442	511	176	89	122
20	151	158	....	60	448	457	525	164	91	118
21	156	161	....	68	425	472	539	153	93	114
22	156	164	....	76	403	487	553	142	95	110
23	156	162	....	85	381	502	567	138	97	106
24	159	160	....	86	359	486	704	134	99	102
25	162	158	....	87	337	471	840	130	95	98
26	165	156	....	88	315	495	798	139	91	94
27	168	156	....	89	315	519	734	148	93	91
28	171	156	....	90	315	543	670	156	95	88
29	174	156	....	91	315	567	606	153	98	85
30	177	149	....	114	315	567	542	150	101	82
31	180	....	....	137	....	567	....	148	104	....

NOTE.—Daily discharge ascertained from a rating curve fairly well defined for 1912, but with no open water measurements since. Gage heights were reported for the following days: Oct. 7, 9, 13, 17, 21, 23; Nov. 4, 6, 14, 16, 19, 22, 26, 29; Dec. 4, 6; Mar. 20, 23, 29, 31; Apr. 2, 8, 19, 26, 29; May 5, 11, 17, 23, 25, 29; June 1, 3, 5, 8, 9, 16, 23, 25, 26; July 6, 8, 9, 14, 16 , 18, 19, 22, 25, 28, 31; Aug. 7, 8, 11, 12, 15, 16, 24, 26; Sept. 3, 7, 11, 17. Daily discharge interpolated for periods intervening between gage heights.

Monthly discharge of Lolo Creek near Lolo, Mont., for the year ending Sept. 30, 1915.

Month.	Discharge in second-feet.			Run-off (total in acre-feet).	Accuracy.
	Maximum.	Minimum.	Mean.		
October	180	108	142	8,730	D.
November	195	137	157	9,340	D.
December 1-6	142	122	128	1,520	D.
March 20-31	137	60	89.2	2,120	D.
April	471	196	350	20,800	D.
May	567	315	419	25,800	D.
June	840	471	611	36,400	D.
July	479	130	194	11,900	D.
August	144	85	104	6,400	D.
September	130	82	114	6,780	D.

ST. REGIS RIVER NEAR ST. REGIS, MONT.

LOCATION.—In the NE. ¼ sec. 28, T. 18 N., R. 28 W., at the St. Regis ranger station, about 3 miles above the town of St. Regis and the junction with Clark Fork, in Missoula County.

DRAINAGE AREA.—278 square miles.

RECORDS AVAILABLE.—September 17, 1910, to September 30, 1915.

GAGE.—Vertical staff on left bank 100 feet below suspension bridge at the ranger station; read daily by E. P. Mizell.

Discharge measurements.—Made by wading or from bridge.

Channel and control.—Small rock; shallow and probably permanent. Banks fairly high and not subject to overflow.

Extremes of discharge.—Maximum stage recorded during year, 4.6 feet April 16 (discharge, 1,900 second-feet); minimum stage recorded, 1.75 feet August 30 to September 2 (discharge, 85 second-feet).

1910–1915: Maximum stage recorded, 7.7 feet May 28, 1913 (discharge, 6,220 second-feet); minimum stage recorded, August 30 to September 2, 1915.

Winter flow.—Stage-discharge relation seriously affected by ice; observations discontinued during winter.

Diversions.—A small amount of water is diverted.

Regulation.—None. The snow melting in the mountains causes a small amount of diurnal fluctuation during the spring months.

Accuracy.—Results fair.

Cooperation.—Field data furnished by United States Forest Service.

No discharge measurements made during the year.

Daily discharge, in second-feet, of St. Regis River near St. Regis, Mont., for the year ending Sept. 30, 1915.

Day.	Oct.	Nov.	Dec.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.
1	150	220	290	....	900	830	640	220	120	85
2	150	290	290	....	970	765	580	220	120	85
3	150	580	272	....	1,040	732	552	220	120	95
4	150	640	255	....	1,040	700	470	220	120	95
5	150	640	255	....	1,040	700	470	220	120	95
6	150	700	....	....	970	670	420	255	120	95
7	150	765	....	....	970	765	420	255	120	120
8	150	765	....	....	900	830	420	238	120	120
9	168	1,040	....	....	830	765	420	220	120	135
10	168	1,040	....	....	765	700	375	220	120	150
11	168	1,040	....	....	830	640	375	220	120	120
12	185	970	....	....	830	670	375	220	120	....
13	185	765	....	....	1,010	640	375	220	120	....
14	185	700	....	....	1,210	580	375	220	120	....
15	185	700	....	185	1,790	580	420	220	120	....
16	185	640	....	238	1,900	640	470	220	120	....
17	185	640	....	255	1,590	580	420	220	120	....
18	185	640	....	290	1,300	640	375	220	120	....
19	185	580	....	330	1,210	700	375	185	120	....
20	185	498	....	420	1,170	640	375	185	108	....
21	185	470	....	470	1,120	670	330	150	95	....
22	185	470	....	525	1,120	700	330	150	95	....
23	185	420	....	580	1,210	640	310	150	95	....
24	185	420	....	525	1,300	670	290	150	95	....
25	185	420	....	470	1,300	640	330	150	95	....
26	185	375	....	470	1,210	640	290	135	95	....
27	185	352	....	470	1,120	580	290	120	95	....
28	185	330	....	445	1,120	580	290	120	95	....
29	185	310	....	470	1,040	610	255	120	95	....
30	185	290	....	498	970	640	220	120	85	....
31	202	....	185	525	....	670	....	120	85	....

Note.—Discharge ascertained from a rating curve fairly well defined above and poorly defined below 1,000 second-feet. Discharge interpolated, for lack of gage readings, Aug. 1–14 and 22–28.

Monthly discharge of St. Regis River near St. Regis, Mont., for the year ending Sept. 30, 1915.

Month.	Discharge in second-feet.			Run-off (total in acre-feet).	Accuracy.
	Maximum.	Minimum.	Mean.		
October	202	150	175	10,800	C.
November	1,040	220	590	35,100	C.
March 15-31	580	185	422	14,200	C.
April	1,900	765	1,130	67,200	B.
May	830	580	671	41,300	C.
June	640	220	388	23,100	C.
July	255	120	190	11,700	C.
August	120	85	110	6,760	C.
September 1-11	150	85	109	2,380	C.

FLATHEAD RIVER NEAR COLUMBIA FALLS, MONT.

Location.—In sec. 7, T. 31 N., R. 19 W., at Potter's ranch, three-fourths of a mile above the junction with the Middle Fork and about 10 miles northeast of Columbia Falls, in Flathead County.

Drainage area.—1,620 square miles.

Records available.—September 22, 1910, to September 30, 1915.

Gage.—Vertical staff on right bank near Potter's ranch buildings; read twice a day by J. F. Potter.

Discharge measurements.—Made from cable about three-fourths of a mile above gage.

Channel and control.—Rocky, clean, and practically permanent. Banks high, not subject to overflow.

Extremes of discharge.—Maximum stage recorded during year, 5.5 feet June 27, 1915 (discharge, 8,200 second-feet); minimum stage recorded, 1.2 feet March 9-14 (discharge, 640 second-feet).

1910-1915: Maximum stage recorded, 8.7 feet June 2, 1913 (discharge 23,800 second-feet); minimum stage recorded, 0.7 foot November 10, 1911, and February 5-6, 1914 (discharge, 350 second-feet).

Winter flow.—Stage-discharge relation not seriously affected by ice. Open-channel rating curve assumed applicable.

Diversions.—None.

Regulation.—None.

Accuracy.—Results excellent except for short periods during the winter.

The following discharge measurement was made by W. A. Lamb:

September 10, 1914: Gage height, 2.00 feet; discharge, 1,260 second-feet.

Daily discharge, in second-feet, of Flathead River near Columbia Falls, Mont., for the year ending Sept. 30, 1915.

Day.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.
1	1,560	2,040	1,560	1,140	960	710	1,140	6,700	4,620	6,220	2,330	1,240
2	1,620	2,970	1,560	1,140	960	710	1,240	7,000	4,840	5,740	2,330	1,240
3	1,730	4,400	1,560	960	960	710	1,560	7,000	5,060	5,280	2,180	1,240
4	1,790	4,400	1,450	960	960	710	1,790	6,220	5,060	4,840	2,180	1,240
5	1,910	4,620	1,450	960	870	710	1,910	5,740	5,060	4,840	2,040	1,240
6	1,910	4,840	1,450	960	870	710	2,040	5,280	4,840	4,400	1,910	1,240
7	1,790	4,400	1,450	960	870	710	2,040	4,840	4,840	4,220	1,910	1,240
8	1,670	4,040	1,340	960	870	710	2,040	5,280	4,840	4,220	1,910	1,190
9	1,670	3,680	1,340	960	870	640	2,040	6,460	4,840	4,040	1,790	1,140
10	1,670	3,500	1,140	960	870	640	1,910	7,300	4,840	4,040	1,790	1,340
11	1,670	3,320	960	960	830	640	1,910	7,600	4,400	3,860	1,670	1,240
12	1,790	3,680	960	960	790	640	2,040	6,700	4,040	3,680	1,670	1,240
13	1,790	3,680	960	960	790	640	2,640	6,220	4,040	3,320	1,670	1,140
14	1,790	3,320	960	960	790	640	4,040	5,980	4,040	3,140	1,790	1,140
15	1,790	2,970	960	960	710	675	4,400	5,980	4,400	2,970	1,790	1,140
16	2,480	2,640	960	960	790	710	4,620	5,740	4,620	2,970	1,670	1,140
17	2,970	2,480	960	960	790	710	5,060	4,840	4,840	3,320	1,670	1,140
18	3,320	2,480	960	960	790	710	5,980	4,620	4,840	3,320	1,560	1,140
19	3,680	2,330	960	960	790	710	6,700	4,400	4,840	3,140	1,560	1,140
20	4,040	2,330	960	960	710	790	7,300	4,040	4,840	2,970	1,560	1,240
21	3,680	2,330	1,100	960	710	790	7,000	3,860	4,400	2,970	1,560	1,240
22	3,320	2,330	1,140	790	710	870	6,220	3,860	4,220	2,800	1,450	1,240
23	2,970	2,330	1,340	830	710	1,050	5,500	4,040	4,040	2,800	1,450	1,140
24	2,640	2,040	1,340	870	710	1,100	4,840	4,220	4,040	2,800	1,450	1,140
25	2,480	1,790	1,140	870	710	1,100	4,400	4,400	3,860	2,640	1,450	1,140
26	2,330	1,790	1,140	870	710	870	4,400	4,400	5,740	2,640	1,340	1,140
27	2,330	1,910	1,140	870	710	1,000	4,220	4,220	8,200	2,640	1,340	1,140
28	2,180	1,910	1,140	790	710	1,050	4,400	4,400	7,600	2,480	1,340	1,140
29	2,040	1,790	1,140	830	....	1,100	4,400	4,620	6,700	2,480	1,240	1,140
30	2,040	1,790	1,140	915	....	1,050	5,500	4,840	6,220	2,480	1,240	1,140
31	2,040	....	1,140	960	....	1,100	....	4,840	....	2,330	1,240	....

NOTE.—Discharge ascertained from a well-defined rating curve.

Monthly discharge of Flathead River near Columbia Falls, Mont., for the year ending Sept. 30, 1915.

[Drainage area, 1,620 square miles.]

Month.	Discharge in second-feet.				Run-off.		Accuracy.
	Maximum.	Minimum.	Mean.	Per square mile.	Depth in inches on drainage area.	Total in acre-feet.	
October	4,040	1,560	2,280	1.41	1.63	140,000	A.
November	4,840	1,790	2,940	1.81	2.02	175,000	A.
December	1,560	960	1,190	.735	.85	73,200	C.
January	1,140	790	939	.580	.67	57,700	C.
February	960	710	804	.496	.52	44,700	C.
March	1,100	640	803	.496	.57	49,400	A.
April	7,300	1,140	3,780	2.33	2.60	225,000	A.
May	7,600	3,860	5,340	3.30	3.80	328,000	A.
June	8,200	3,860	4,960	3.06	3.41	295,000	A.
July	6,220	2,330	3,540	2.19	2.52	218,000	A.
August	2,330	1,240	1,680	1.04	1.20	103,000	A.
September	1,340	1,140	1,190	.735	.82	70,800	A.
The year	8,200	640	2,460	1.52	20.61	1,780,000	

NOTE.—Stage-discharge relation possibly affected by ice and accuracy reduced December, January, and February.

FLATHEAD LAKE AT POLSON, MONT.

Location.—In the SE. ¼ sec. 4, T. 22 N., R. 20 W., at the steamboat dock at Polson, at the south end of the lake, in Flathead County.

Drainage area.—Not measured.

Records available.—August 23, 1908, to September 30, 1915.

Gage.—Vertical staff attached to a pile at the end of the pier; datum 2,800 feet above sea level. Gage read daily by V. L. Holding.

Extremes of stage.—Maximum stage recorded during year, 84 feet May 17 and 18; minimum stage recorded, 79.1 feet March 15 to 20.

1908–1915: Maximum stage recorded, 92.5 feet June 11 and 12, 1913; minimum stage recorded, 78.5 feet February 16–22, 1913.

Diversions.—None of importance.

Regulation.—None.

Daily gage height, in feet, of Flathead Lake at Polson, Mont., for the year ending Sept. 30, 1915.

Day.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.
1	79.9	80.6	81.3	80.1	79.6	79.3	79.4	82.8	83.6	83.7	82.5	80.7
2	80.0	80.6	81.3	80.0	79.6	79.3	79.4	83.0	83.6	83.8	82.5	80.7
3	80.0	80.7	81.2	80.0	79.5	79.3	79.4	83.2	83.6	83.8	82.4	80.6
4	80.1	80.8	81.2	80.0	79.5	79.3	79.5	83.3	83.6	83.8	82.4	80.6
5	80.1	81.0	81.2	80.0	79.5	79.2	79.6	83.4	83.6	83.7	82.3	80.6
6	80.2	81.1	81.1	80.0	79.5	79.2	79.7	83.5	83.7	83.7	82.3	80.5
7	80.2	81.2	81.1	80.0	79.5	79.2	79.8	83.4	83.7	83.6	82.2	80.5
8	80.2	81.3	81.0	80.0	79.5	79.2	79.9	83.4	83.7	83.6	82.1	80.5
9	80.2	81.4	81.0	80.0	79.5	79.2	80.0	83.5	83.7	83.5	82.1	80.4
10	80.2	81.4	80.9	79.9	79.5	79.2	80.1	83.5	83.7	83.5	82.0	80.4
11	80.3	81.4	80.9	79.9	79.5	79.2	80.1	83.6	83.7	83.4	81.9	80.4
12	80.3	81.4	80.8	79.9	79.5	79.2	80.2	83.6	83.7	83.4	81.8	80.3
13	80.3	81.3	80.7	79.9	79.5	79.2	80.3	83.7	83.6	83.3	81.7	80.3
14	80.3	81.4	80.6	79.9	79.4	79.2	80.4	83.8	83.6	83.3	81.7	80.3
15	80.2	81.6	80.6	79.9	79.4	79.1	80.5	83.9	83.6	83.2	81.6	80.3
16	80.2	81.7	80.5	79.9	79.4	79.1	80.6	83.9	83.6	83.2	81.5	80.3
17	80.3	81.6	80.5	79.8	79.4	79.1	80.7	84.0	83.5	83.1	81.5	80.3
18	80.3	81.6	80.4	79.8	79.4	79.1	81.0	84.0	83.5	83.1	81.4	80.3
19	80.4	81.6	80.4	79.8	79.4	79.1	81.3	84.0	83.5	83.1	81.3	80.3
20	80.4	81.5	80.3	79.8	79.4	79.1	81.5	83.9	83.5	83.1	81.3	80.3
21	80.5	81.5	80.3	79.8	79.4	79.2	81.7	83.9	83.4	83.1	81.2	80.3
22	80.6	81.5	80.3	79.8	79.4	79.2	81.9	83.9	83.4	83.0	81.1	80.3
23	80.6	81.5	80.2	79.7	79.3	79.2	82.1	83.8	83.4	83.0	81.1	80.3
24	80.7	81.4	80.2	79.7	79.3	79.2	82.2	83.8	83.4	82.9	81.0	80.3
25	80.7	81.4	80.2	79.7	79.3	79.3	82.3	83.8	83.3	82.9	81.0	80.3
26	80.7	81.4	80.1	79.7	79.3	79.3	82.4	83.7	83.3	82.8	80.9	80.3
27	80.7	81.4	80.1	79.7	79.3	79.3	82.5	83.7	83.4	82.8	80.9	80.3
28	80.7	81.3	80.1	79.6	79.3	79.3	82.5	83.7	83.6	82.7	80.8	80.3
29	80.7	81.3	80.1	79.6	....	79.4	82.6	83.7	83.6	82.7	80.8	80.2
30	80.7	81.3	80.1	79.6	....	79.4	82.7	83.7	83.7	82.6	80.8	80.2
31	80.7	....	80.1	79.6	....	79.4	....	83.6	....	82.6	80.7	....

FLATHEAD RIVER NEAR POLSON, MONT.

Location.—At Mishell's ferry, at Norrisvale, 2½ miles below Newell tunnel, 10 miles below Polson and Flathead Lake, and 15 miles northwest of Ronan, in Flathead County.

Drainage area.—7,010 square miles.

Records available.—July 23, 1907, to September 30, 1915.

Gage.—Chain gage attached to overhanging tree on right bank, 80 feet above the ferry; read once a day by Barney Whitlock.

Discharge measurements.—Made from car on ferry cable 80 feet below gage.

Channel and control.—Bed of stream composed of small boulders. Mean depth of water at low stages about 6 feet. Current moderately swift. Control not well defined at high water; low-water control is at a riffle about 800 feet below gage. Banks high and not subject to overflow.

Extremes of discharge.—Maximum stage recorded during year, 8 feet May 16, 18, and 20 (discharge, 21,000 second-feet); minimum stage recorded, 1.4 feet March 10–14 (discharge, 2,310 second-feet).

1907–1915: Maximum stage recorded, 16.4 feet June 12, 1913 (discharge, 75,400 second-feet); minimum stage recorded, 1.2 feet December 29–30, 1912 (discharge, 2,150 second-feet).

Winter flow.—Stage-discharge relation not seriously affected by ice; open-channel rating curve assumed applicable.

Diversions.—Some small diversions from tributaries above Flathead Lake.

Regulation.—Natural storage in Flathead Lake.

Accuracy.—Gage readings somewhat affected by wind on Flathead Lake and also at gage. Results excellent except for winter months.

No discharge measurements made during year.

Daily discharge, in second-feet, of Flathead River near Polson, Mont., for the year ending Sept. 30, 1915.

Day.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.
1	4,170	6,060	7,820	4,170	2,900	2,590	2,900	13,200	19,000	19,000	13,200	6,290
2	4,170	6,060	7,820	3,880	2,900	2,490	2,900	13,600	18,000	19,000	12,800	6,060
3	4,170	6,520	7,540	4,020	3,010	2,490	2,900	14,400	19,000	19,000	12,800	6,060
4	4,500	6,720	7,540	4,170	3,120	2,590	2,900	15,300	18,500	19,000	12,800	6,290
5	4,670	7,270	7,540	4,170	2,900	2,490	3,010	16,200	19,000	19,000	12,000	6,060
6	4,670	7,540	7,540	4,330	2,900	2,490	3,120	15,700	19,000	19,000	12,000	6,060
7	4,500	8,110	7,010	4,170	2,900	2,490	3,350	16,200	19,000	18,500	12,000	5,840
8	4,850	8,110	7,010	4,020	2,900	2,490	3,470	16,200	18,000	18,000	12,000	5,630
9	4,670	8,400	6,760	3,880	2,900	2,490	3,600	16,200	18,500	18,000	11,300	5,430
10	4,500	8,700	6,520	3,740	2,900	2,310	3,880	16,200	18,500	18,000	11,300	5,630
11	4,500	8,400	6,060	3,740	2,900	2,310	4,500	18,500	19,000	17,100	10,900	5,630
12	4,500	8,700	6,060	3,880	2,900	2,310	4,500	19,000	19,000	17,100	10,600	5,230
13	4,670	9,000	5,230	3,740	2,900	2,310	4,500	19,500	18,500	16,600	10,200	5,040
14	4,670	9,620	5,430	3,600	2,690	2,310	4,850	20,000	19,000	16,200	9,930	4,670
15	4,850	9,930	5,230	3,740	2,690	2,400	5,040	20,500	18,000	15,700	9,930	4,500
16	4,850	9,930	5,040	3,880	2,790	2,400	5,230	21,000	18,000	15,700	9,310	4,850
17	4,850	9,310	4,850	3,470	2,690	2,400	6,060	20,500	17,500	15,300	9,310	4,850
18	6,060	9,310	5,040	3,350	2,690	2,400	6,290	21,000	17,500	15,300	9,310	4,850
19	6,060	9,310	5,230	3,350	2,690	2,400	7,010	20,500	17,500	15,300	9,310	4,850
20	6,060	9,310	5,230	3,350	2,690	2,400	7,540	21,000	17,500	15,300	9,000	4,850
21	6,060	9,310	5,230	3,350	2,690	2,400	8,110	20,000	17,100	15,300	8,700	4,850
22	6,520	9,000	4,850	3,470	2,690	2,400	8,700	19,500	17,500	14,400	8,700	4,850
23	6,520	8,700	4,670	3,350	2,690	2,490	9,930	20,000	17,100	14,800	8,110	4,850
24	6,520	8,700	4,500	3,350	2,690	2,490	11,300	19,000	17,100	14,800	7,820	5,040
25	6,290	8,700	4,170	3,350	2,690	2,590	11,300	18,500	17,100	14,400	7,540	5,040
26	6,290	8,700	4,170	3,230	2,690	2,590	11,300	19,000	17,100	14,400	7,540	4,850
27	6,290	8,400	4,170	3,120	2,590	2,690	11,300	18,500	17,100	14,400	7,010	4,850
28	6,290	8,110	4,170	3,120	2,490	2,590	11,300	18,500	18,000	14,400	7,010	5,040
29	6,060	7,540	4,170	3,230	....	2,690	12,000	18,500	18,000	13,600	6,520	4,850
30	6,060	7,540	4,170	3,350	....	2,900	12,400	19,000	18,500	13,600	6,520	4,850
31	6,060	....	4,170	3,010	....	2,900	....	18,500	....	12,800	6,520	....

Note.—Discharge ascertained from a well-defined rating curve.

Monthly discharge of Flathead River near Polson, Mont., for the year ending Sept. 30, 1915.

[Drainage area, 7,010 square miles.]

Month.	Discharge in second-feet.				Run-off.		Accuracy.
	Maximum.	Minimum.	Mean.	Per square mile.	Depth in inches on drainage area.	Total in acre-feet.	
October	6,520	4,170	5,320	0.759	0.88	327,000	A.
November	9,930	6,060	8,370	1.19	1.33	498,000	A.
December	7,820	4,170	5,640	.806	.93	347,000	B.
January	4,330	3,010	3,630	.518	.60	223,000	B.
February	3,120	2,490	2,790	.398	.41	155,000	B.
March	2,900	2,310	2,490	.355	.41	153,000	A.
April	12,400	2,900	6,510	.929	1.04	387,000	A.
May	21,000	13,200	18,200	2.60	3.00	1,120,000	A.
June	19,000	17,100	18,100	2.58	2.88	1,080,000	A.
July	19,000	12,800	16,200	2.31	2.66	996,000	A.
August	13,200	6,520	9,740	1.39	1.60	599,000	A.
September	6,290	4,500	5,260	.750	.84	313,000	A.
The year	21,000	2,310	8,560	1.22	16.58	6,200,000	

MIDDLE FORK OF FLATHEAD RIVER AT BELTON, MONT.

Location.—In NW. ¼ sec. 36, T. 32 N., R. 19 W., at Hotel Belton, half a mile below the highway bridge at Belton, about 2 miles above the junction of Lake McDonald outlet, in Flathead County.

Drainage area.—900 square miles.

Records available.—October 15, 1910, to September 30, 1915.

Gage.—Sloping gage on left bank directly back of Hotel Belton; read daily by A. S. Lanneau and S. C. Brock.

Discharge measurements.—Made from a cable 200 feet below the gage.

Channel and control.—Practically permanent; banks high and not subject to overflow.

Extremes of discharge.—Maximum stage recorded during year, 7.2 feet May 2 (discharge, 6,820 second-feet); minimum stage probably occurred during winter season.

1910–1015: Maximum stage recorded, 13.9 feet May 27, 1913 (discharge, 25,900 second-feet); minimum stage recorded, 1.3 feet March 29–30, 1912 (discharge, 182 second-feet).

Winter flow.—Stream freezes over at gage for short periods during winter, but usually remains open at control section below gage.

Diversions.—None.

Regulation.—None.

Accuracy.—Results good.

No discharge measurements made during the year.

Daily discharge in second-feet of Middle Fork of Flathead River at Belton, Mont., for the year ending Sept. 30, 1915.

Day.	Oct.	Nov.	Dec.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.
1	510	1,100	1,240	182	895	5,960	3,170	3,770	1,770	830
2	960	2,300	1,160	182	960	6,820	3,170	3,610	1,670	862
3	1,100	2,300	1,160	192	1,020	5,190	3,460	3,460	1,580	1,100
4	1,240	2,190	1,160	192	2,410	4,100	3,770	3,460	1,580	1,100
5	1,320	2,080	1,100	192	2,300	3,460	4,100	3,460	1,480	1,020
6	1,020	2,080	1,100	204	2,190	3,030	4,100	3,170	1,400	1,160
7	960	1,870	1,100	215	1,970	2,650	4,270	3,170	1,400	960
8	535	1,770	400	215	1,970	2,410	4,270	2,770	1,320	895
9	535	1,100	400	240	1,770	3,030	4,100	2,770	1,320	895
10	535	1,100	325	240	1,770	5,580	4,100	3,030	1,240	1,160
11	535	1,100	325	252	1,670	5,780	3,930	2,650	1,240	1,020
12	535	1,100	325	252	2,080	6,190	3,770	2,410	1,240	960
13	535	1,100	325	265	2,300	6,190	3,770	2,190	1,160	960
14	535	1,100	325	265	2,900	5,780	3,770	2,300	1,240	960
15	1,580	1,400	295	310	3,030	5,780	3,610	2,190	1,160	960
16	1,670	1,320	295	360	3,170	5,580	3,460	2,080	1,160	1,020
17	1,670	1,320	295	400	3,770	5,380	3,610	2,080	1,100	1,320
18	1,670	1,240	295	440	5,190	4,270	3,770	3,170	1,100	1,400
19	1,670	1,240	295	485	6,400	3,930	3,770	2,900	1,100	1,400
20	1,580	1,320	265	510	6,400	3,460	3,610	2,770	1,020	1,400
21	1,480	1,400	265	590	5,960	3,170	3,460	2,650	1,020	1,400
22	1,400	1,400	265	650	5,960	3,030	3,170	2,410	960	1,320
23	1,240	1,400	265	800	4,270	2,770	3,170	2,410	960	1,240
24	1,240	1,320	265	830	3,930	2,770	3,310	2,300	960	1,020
25	1,240	1,320	265	895	3,170	3,030	3,460	2,190	928	895
26	1,160	1,320	265	895	3,170	3,030	3,460	2,080	895	895
27	1,100	1,240	295	928	3,310	3,170	6,400	2,080	862	895
28	1,100	1,240	295	895	3,310	3,460	5,960	2,190	830	895
29	1,100	1,240	295	862	3,460	3,460	5,580	2,080	830	960
30	1,100	1,240	295	862	3,460	3,460	5,380	1,970	830	960
31	1,100	....	295	895	....	3,460	....	1,770	830	....

NOTE.—Discharge ascertained from a well-defined rating curve. Discharge Jan. 1 to Feb. 27 not determined, because of ice jams and uncertainty as to gage readings.

Monthly discharge of Middle Fork of Flathead River, at Belton, Mont., for the year ending Sept. 30, 1915.

[Drainage area, 900 square miles.]

Month.	Discharge in second-feet.				Run-off.		Accuracy.
	Maximum.	Minimum.	Mean.	Per square mile.	Depth in inches on drainage area.	Total in acre-feet.	
October	1,670	510	1,100	1.22	1.41	67,600	A.
November	2,300	1,100	1,440	1.60	1.78	85,700	A.
December	1,240	265	492	.547	.63	30,300	B.
March	928	182	474	.527	.61	29,100	C.
April	6,400	895	3,140	3.49	3.89	187,000	A.
May	6,820	2,410	4,170	4.63	5.34	256,000	A.
June	6,400	3,170	3,960	4.40	4.91	236,000	A.
July	3,770	1,770	2,630	2.92	3.37	162,000	A.
August	1,770	830	1,170	1.30	1.50	71,900	A.
September	1,400	830	1,060	1.18	1.32	63,100	A.

NOTE.—Discharge relation probably affected by ice and accuracy reduced December and March.

SOUTH FORK OF FLATHEAD RIVER NEAR COLUMBIA FALLS, MONT.

LOCATION.—In the NW. ¼ SW. ¼ sec. 4, T. 30 N., R. 19 W., at the highway bridge, half a mile above the junction with Flathead River, and about 7 miles east of Columbia Falls, in Flathead County.

DRAINAGE AREA.—1,640 square miles.

Records available.—September 20, 1910, to September 30, 1915. (No gage-height record during 1910.)

Gage.—Chain gage on right span of bridge; read irregularly by employees of United States Forest Service.

Discharge measurements.—Made from bridge at gage.

Channel and control.—Gravel and small rock; control probably permanent; banks high and not subject to overflow.

Extremes of discharge.—Maximum stage recorded during year, 6.5 feet June 25 (discharge, 7,300 second-feet); minimum stage recorded, 3.3 feet September 8 (discharge, 735 second-feet).

1910–1915: Maximum stage recorded, 14.8 feet June 3, 1913 (discharge, 39,000 second-feet); minimum stage recorded, 3.05 feet October 1, 1913 (discharges 520 second-feet).

Winter flow.—Stage-discharge relation seriously affected by ice; observation, discontinued during winter.

Diversions.—None.

Regulation.—None.

Accuracy.—Results good.

Cooperation.—Gage-height record furnished by United States Forest Service.

No discharge measurements made during the year.

Daily discharge, in second-feet, of South Fork of Flathead River near Columbia Falls, Mont., for the year ending Sept. 30, 1915.

Date.	Discharge.	Date.	Discharge.	Date.	Discharge.
Oct. 12	888	June 16	5,560	Aug. 28	1,420
17	2,570	25	7,300	Sept. 3	1,170
Apr. 3	3,380	July 4	4,530	4	1,300
May 5	4,780	10	3,820	8	735
14	4,780	25	5,030	10	940
23	5,290	Aug. 2	2,760	28	2,960
27	5,290	3	2,760		
June 2	5,030	11	1,570		

Note.—Discharge ascertained from a fairly well defined rating curve.

LITTLE BITTERROOT RIVER NEAR MARION, MONT.

Location.—In T. 27 N., R. 24 W., at the log bridge just below the outlet of Little Bitterroot Lake, near Marion, in Flathead County.

Drainage area.—Not measured.

Records available.—January 1, 1910, to September 30, 1915.

Gage.—Vertical staff in middle of stream; read every second day by Bonnell Kelsey.

Discharge measurements.—Made by wading.

Channel and control.—Fairly permanent in natural condition; somewhat obstructed by moss and weeds; banks high and not subject to overflow.

Extremes of dsicharge.—Maximum stage recorded during year, 1.0 foot August 29, September 3 and 5 (discharge, 5.8 second-feet); minimum stage recorded, 0.3 foot January 19–23 (no flow).

1910–1915: Maximum stage recorded, 2.9 feet May 24, 1910 (discharge, 43 second-feet); minimum stage recorded, January 19–23, 1915.

Winter flow.—Stage-discharge relation not seriously affected by ice; open-channel rating curve assumed applicable.

Diversions.—None.

Regulation.—Some water was stored in the lake above the gage during the spring and summer of 1915. The low discharge is due to this regulation.

Accuracy.—Results fair.

Discharge measurements of Little Bitterroot River near Marion, Mont., during the year ending Sept. 30, 1915.

[Made by W. A. Lamb.]

Date.	Gage height.	Discharge.
	Feet.	*Sec.-ft.*
May 12	0.50	0.5
Sept. 9	.90	4.3

Daily discharge, in second-feet, of Little Bitterroot River near Marion, Mont., for the year ending Sept. 30, 1915.

Day.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.
1	2.1	0.8	1.2	1.4	0.4	0.8	0.6	0.1	0.1	2.5	1.6	5.0
2	2.1	.8	1.2	1.2	.2	1.0	.6	2.5	.2	2.2	1.4	5.4
3	2.1	.8	1.2	1.0	.1	1.2	.5	1.8	.3	2.0	1.2	5.8
4	2.4	.8	1.2	.8	.1	1.2	.5	1.2	.2	1.8	1.0	5.8
5	2.6	.8	1.2	.6	.1	1.2	.5	1.0	.1	1.6	.8	5.8
6	2.9	.8	1.2	.4	.1	1.0	.5	.8	.3	1.4	.8	5.4
7	3.2	.8	1.2	.3	.1	.8	.5	.8	.3	1.2	.8	5.0
8	3.2	.8	1.2	.2	.2	.8	.5	.8	.3	1.2	.6	4.6
9	3.2	.8	1.2	.1	.3	.8	.5	.8	.2	1.2	.5	4.3
10	3.5	.8	1.2	.1	.4	.6	.6	.8	.2	1.0	.6	4.0
11	3.8	.8	1.2	.1	.5	.5	.6	.8	.2	.8	.8	3.6
12	3.8	.8	1.2	.05	.5	.5	.6	.8	.3	.8	.8	3.3
13	3.8	.8	1.2	.05	.5	.5	.6	.8	.8	.8	.8	3.0
14	3.8	.8	1.2	.05	.5	.5	.7	.6	1.0	1.0	.6	3.0
15	3.8	.8	1.2	.05	.5	.5	.8	.6	1.2	1.2	.5	3.0
16	3.8	.8	1.2	.05	.5	.6	.8	.8	1.4	1.2	.5	3.6
17	3.8	.8	1.2	.05	.5	.6	.8	.8	1.6	1.2	.5	3.0
18	3.8	.8	1.2	.05	.4	.6	.5	.8	1.8	1.2	.4	3.0
19	3.8	.8	1.2	.0	.3	.6	.5	.8	2.0	1.4	.3	3.0
20	3.8	.8	1.2	.0	.3	.6	.5	.8	1.6	1.6	.2	3.3
21	3.8	.8	1.2	.0	.3	.6	.5	.7	1.8	1.4	.1	3.6
22	3.8	.8	1.4	.0	.5	.7	.5	.6	2.0	1.2	.1	3.3
23	3.8	.8	1.6	.0	.5	.8	.5	3.0	2.2	1.4	.1	3.0
24	3.0	.9	1.6	.05	.5	.8	.5	2.5	2.5	1.6	.2	3.0
25	2.1	1.0	1.6	.2	.5	.8	.8	2.0	2.6	1.4	.3	3.0
26	1.4	1.0	1.6	.4	.5	.8	.4	1.8	2.8	1.2	.3	3.3
27	.8	1.2	1.6	.4	.5	.8	.1	1.6	2.5	1.2	.3	3.6
28	.8	1.2	1.6	.4	.6	.8	.1	1.0	2.2	1.2	3.0	3.3
29	.8	1.2	1.6	.4	......	.8	.1	.5	2.0	1.2	5.8	3.0
30	.8	1.2	1.6	.3	......	.6	.1	.8	2.2	1.2	5.4	3.0
31	.8	......	1.6	.3	......	.5	......	.4	......	1.4	5.0	......

NOTE.—Discharge ascertained from two fairly well defined rating curves, applicable Oct. 1 to Jan. 6, and Jan. 7 to Sept. 30, respectively. Low discharge during part of year due to storage of water in lake above gage. Gage read usually every second day; discharge interpolated for intervening days.

Monthly discharge of Little Bitterroot River near Marion, Mont., for the year ending Sept. 30, 1915.

Month.	Discharge in second-feet.			Run-off (total in acre-feet).
	Maximum.	Minimum.	Mean.	
October	3.8	0.8	2.81	173
November	1.2	.8	.87	52
December	1.6	1.2	1.32	81
January	1.4	.0	.29	18
February	.6	.1	.37	21
March	1.2	.5	.74	46
April	.8	.1	.51	30
May	3.0	.1	1.06	65
June	2.8	.1	1.23	73
July	2.5	.8	1.35	83
August	5.8	.1	1.14	70
September	5.8	3.0	3.83	228
The year	5.8	.0	1.30	940

LITTLE BITTERROOT RIVER NEAR HUBBART, MONT.

Location.—Above the canyon leading to the second fall of Little Bitterroot River, 1½ miles west of the ranch buildings of the Hubbart Cattle Co., near Hubbart post office, and 15 miles south of Marion, in Flathead County.

Drainage area.—Not measured.

Records available.—April 22, 1909, to September 30, 1915.

Gage.—Vertical staff on left bank; read twice a week by C. A. Strodtbeck. From April 22 to October 17, 1909, gage was in box canyon below falls, about a mile downstream.

Discharge measurements.—Made by wading near gage.

Channel and control.—Gravel and silt; shifts at high stages. Channel slightly obstructed by growth of moss and weeds during summer. Banks high and not subject to overflow at ordinary stages.

Extremes of discharge.—Maximum stage recorded during year, 1.85 feet April 20 (discharge, 64 second-feet); minimum stage recorded, 0.9 foot October 20–27 and November 10 (discharge, 1.4 second-feet).

1909–1915: Maximum stage recorded, 4.0 feet March 22, 1910 (discharge, 206 second-feet); minimum stage recorded, 0.9 foot October 20–27 and November 10, 1914 (discharge, 1.4 second-feet).

Winter flow.—Stage-discharge relation seriously affected by ice; observations discontinued during winter.

Diversions.—None.

Regulation.—Stream affected slightly by storage in Little Bitterroot Lake about 15 miles above the station.

Accuracy.—Results only fair.

Discharge measurements of Little Bitterroot River near Hubbart, Mont., during the year ending Sept. 30, 1915.

[Made by W. A. Lamb.]

Date.	Gage height.	Discharge.
	Feet.	*Sec.-ft.*
May 12	1.29	24
June 20	[a] 1.25	15.7
Sept. 9	[a] 1.31	12.1

[a] Channel obstructed by a growth of moss and weeds.

Daily discharge, in second-feet, of Little Bitterroot River near Hubbart, Mont., for the year ending Sept. 30, 1915.

Day.	Oct.	Nov.	Apr.	May.	June.	July.	Aug.	Sept.
1	1.9	1.9	22	31	37	14	14	7.1
2	1.9	2.4	25	31	37	14	13	7.4
3	1.9	2.4	28	31	33	14	12	7.7
4	1.9	2.4	31	31	29	14	12	8.0
5	2.4	2.2	34	30	29	14	11	8.0
6	2.4	1.9	38	28	29	14	10	10
7	2.4	1.9	34	26	25	14	10	10
8	2.4	1.9	30	25	25	14	10	11
9	2.4	1.4	26	25	25	14	10	12
10	2.4	1.4	22	25	22	14	10	12
11	2.4	2.0	26	25	20	13	10	12
12	2.4	2.6	30	25	20	12	9.7	12
13	2.4	3.2	34	26	20	11	9.5	10
14	2.4	3.8	37	27	16	12	9.2	10
15	2.2	5.1	40	28	16	13	9.2	10
16	1.9	6.4	43	30	16	14	9.2	10
17	1.9	7.7	45	32	16	16	9.2	10
18	1.9	7.0	51	34	16	15	9.1	10
19	1.4	6.2	57	36	16	14	9.0	10
20	1.4	5.5	64	38	16	13	8.9	10
21	1.4	4.8	58	40	14	13	8.8	10
22	1.4	3.8	51	42	13	13	8.8	10
23	1.4	2.8	44	42	14	12	8.8	10
24	1.4	1.9	38	38	15	12	8.8	10
25	1.4	1.9	38	38	16	12	8.3	10
26	1.4	1.9	34	38	18	10	7.8	10
27	1.4	1.9	34	42	18	10	7.3	12
28	1.4	1.9	33	45	15	11	6.8	12
29	1.6	1.9	32	45	15	13	6.8	12
30	1.9	1.9	31	42	15	14	6.8	12
31	1.9	....	....	39	....	15	6.8	....

NOTE.—Discharge ascertained as follows: Oct. 1 to Nov. 30, Apr. 1 to May 31, and Sept. 1–30, from a poorly defined rating curve; June 1 to Aug. 31 by method for shifting control.

Monthly discharge of Little Bitterroot River near Hubbart, Mont., for the year ending Sept. 30, 1915.

Month.	Discharge in second-feet.			Run-off (total in acre-feet).	Accuracy.
	Maximum.	Minimum.	Mean.		
October	2.4	1.4	1.90	117	D.
November	7.7	1.4	3.13	186	D.
April	64	22	37.0	2,200	D.
May	45	25	33.4	2,050	C.
June	37	13	20.5	1,220	C.
July	16	10	13.2	812	C.
August	14	6.8	9.38	577	C.
September	12	7.1	10.2	607	C.

CROW CREEK NEAR RONAN, MONT.

Location.—In the SW. ¼ sec. 13, T. 20 N., R. 20 W., at the old highway bridge about a quarter of a mile above the present bridge on the stage road from St. Ignatius to Ronan, Missoula County, 3 miles south of Ronan, above all tributaries.

Drainage area.—Not measured.

Records available.—September 21, 1906, to September 30, 1915.

Gage.—Staff gage on center pier of old bridge, installed September 7, 1913; read once a day by Mrs. J. A. Nordgren. From September 21, 1906, to September 7, 1913, staff gage nailed to the left abutment of bridge at same datum.

Discharge measurements.—Made by wading or from new highway bridge 500 feet below gage.

Channel and control.—Bed composed of sand and mud. Current is very sluggish at the gage. Sand bar about 50 feet downstream forms partial control; shifts slightly. During the summer some vegetation grows on this bar. Banks fairly high. At extremely high stages water overflows right bank about 100 feet above the gage forming a small secondary channel. During the high water period of 1915, a new channel was formed across a bend about 500 feet below the gage, causing a change in the stage-discharge relation.

Extremes of discharge.—Maximum stage recorded during year, 6.3 feet at 10 a. m., July 18 (discharge, 408 second-feet); minimum stage recorded, 0.9 foot October 9–13 (discharge, 14 second-feet).

1906–1915: Maximum stage recorded, 10.85 feet June 6, 1908 (discharge, 1,400 second-feet); minimum stage recorded, 0.8 foot September 27, 1910, and 0.9 foot October 9–13, 1914 (discharge, 14 second-feet).

These records are for the open season only. A lower flow may have occurred during winter.

Winter flow.—Stage-discharge relation seriously affected by ice; observations discontinued during winter.

Diversions.—Water is diverted above station by the Pablo Feeder canal.

Regulation.—None.

Accuracy.—Results fair.

Discharge measurements of Crow Creek near Ronan, Mont., during the year ending Sept. 30, 1915.

Date.	Made by—	Gage height.	Discharge.	Date.	Made by—	Gage height.	Discharge.
		Feet.	*Sec.-ft.*			*Feet.*	*Sec.-ft.*
May 10	W. A. Lamb	[a] 3.90	212	July 25	W. A. Lamb	3.32	138
June 18	.....do	[a] 3.90	190	Sept. 15	B. E. Jones	1.65	36

[a] Water flowing through new channel at the bend 500 feet below gage.

Daily discharge, in second-feet, of Crow Creek near Ronan, Mont., for the year ending Sept. 30, 1915.

Day.	Oct.	Nov.	Dec.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.
1	16	55	33	52	57	133	158	172	54	31
2	17	55	30	52	60	97	165	164	49	30
3	21	51	28	52	62	118	164	164	49	31
4	26	51	25	47	62	125	163	156	45	34
5	31	51	25	50	62	133	162	164	45	36
6	28	51	25	54	62	166	162	172	41	37
7	20	51	25	57	62	184	161	172	41	34
8	16	51	25	57	62	203	151	180	37	34
9	14	51	26	57	62	184	166	196	37	34
10	14	51	28	54	62	198	156	249	37	34
11	14	51	28	52	62	193	164	231	34	34
12	14	51	26	54	64	203	164	196	32	34
13	14	51	....	57	79	223	188	172	32	34
14	18	51	....	57	85	233	180	172	31	34
15	22	51	....	57	104	243	164	213	28	39
16	30	53	....	62	141	229	180	249	30	45
17	59	55	....	62	193	210	180	378	28	43
18	109	53	....	62	213	201	176	378	28	39
19	159	49	....	67	243	192	172	276	28	37
20	143	45	....	64	243	167	188	222	31	37
21	129	45	....	62	223	166	180	188	31	34
22	109	43	....	62	203	198	196	156	32	34
23	79	39	....	62	184	214	213	132	34	34
24	47	39	....	62	149	231	267	124	31	37
25	31	39	....	70	118	248	303	128	31	34
26	21	39	....	82	97	247	378	164	31	34
27	24	39	....	85	64	194	303	180	31	164
28	35	39	....	76	62	169	258	164	34	148
29	47	37	....	67	70	176	180	148	34	109
30	49	35	....	62	85	175	180	116	31	88
31	59	....	....	62	....	158	....	62	31	....

NOTE.—Discharge ascertained as follows: Oct. 1 to Dec. 12, from a fairly well defined rating curve; Mar. 1 to May 15, from a poorly defined rating curve; May 16 to June 9, by method for shifting control; June 10 to Sept. 30, from a rating curve fairly well defined below and poorly defined above 195 second-feet.

Monthly discharge of Crow Creek near Ronan, Mont., for the year ending Sept. 30, 1915.

Month.	Discharge in second-feet.			Run-off (total in acre-feet).	Accuracy.
	Maximum.	Minimum.	Mean.		
October	159	14	45.6	2,800	B.
November	55	35	47.4	2,820	B.
December 1-12	33	25	27.0	643	C.
March	85	47	60.6	3,730	C.
April	243	57	110	6,550	C.
May	248	97	187	11,500	C.
June	378	151	194	11,500	C.
July	378	62	188	11,600	C.
August	54	28	35.1	2,160	B.
September	164	30	47.6	2,830	B.

NOTE.—Diversions were made above the station as follows: October, 2,860 acre-feet; May, 2,984 acre-feet; June, 1,626 acre-feet; August, 346 acre-feet.

CROW CREEK AT LOZEAU'S RANCH, NEAR RONAN, MONT.

Location.—In the E. ½ sec. 15, T. 20 N., R. 21 W., at Louis Lozeau's ranch, about a mile below the mouth of Mud Creek, 2½ miles above junction of Crow Creek with Flathead River, and 8 miles southwest of Ronan, in Missoula County.

Drainage area.—Not measured.

Records available.—April 21, 1911, to September 30, 1915.

Gage.—Vertical staff with cast-iron face attached to log framework protecting left bank 100 feet below the private highway bridge at Lozeau's ranch, read May 10 to September 30, 1915. April 21, 1912, to May 9, 1915, staff gage on right bank 200 feet upstream from the present gage and at different datum.

Discharge measurements.—Made from bridge or by wading.

Channel and control.—Bed of stream composed of gravel and cobblestones at the gage and at the control; likely to change at high stages. Current swift at high stages.

Extremes of discharge.—Maximum stage recorded during year, 3.15 feet April 25 (discharge, 410 second-feet); minimum stage recorded, 2.55 feet August 27–29 (discharge, 42 second-feet).

1911–1915: Maximum stage recorded, 3.4 feet June 29, 1911 (discharge, 960 second-feet); minimum stage recorded, 0.8 foot March 21, 1913 (discharge, 4 second-feet).

Winter flow.—Stage-discharge relation seriously affected by ice; observations discontinued during winter.

Diversions.—Water is diverted from the various branches of Crow Creek by the Pablo Feeder canal supplying Pablo reservoir. A canal also heads just below the mouth of Mud Creek about a mile above the gage.

Regulation.—None.

Accuracy.—Results good except during high water.

Discharge measurements at Crow Creek at Lozeau's ranch, near Ronan, Mont., during 1914–15.

Date.	Made by—	Gage height.		Discharge.	Date.	Made by—	Gage height.		Discharge.
		Old gage.	New gage.				Old gage.	New gage.	
1914.		*Feet.*	*Feet.*	*Sec.-ft.*	1915.		*Feet.*	*Feet.*	*Sec.-ft.*
May 14	W. A. Lamb...	1.82	....	108	May 10	W. A. Lamb...	2.85	3.60	188
June 16	.....do..........	2.01	3.68	211	June 18	.....do..........	....	3.65	209
July 28	.....do..........	1.61	2.89	63	July 25	.....do..........	....	3.48	153
Nov. 23	.....do..........	2.24	....	84	Sept. 16	B. E. Jones.....	....	2.97	74

Daily discharge, in second-feet, of Crow Creek at Lozeau's ranch, near Ronan, Mont., for the year ending Sept. 30, 1915.

Day.	Nov.	Dec.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.
1	179	72		50		188	217	123	50
2	164	72		65		202	188	110	50
3	136	72		65		175	188	102	54
4	136	72		65		188	188	102	57
5	122	80		80		188	175	102	57
6	110	72		72		188	139	102	57
7	90	43		50		188	139	102	57
8	90	43		50		188	139	102	57
9	90	43		53		188	139	102	61
10	99	43		50	179	249	188	94	65
11	90	48		53	217	249	249	87	65
12	90	43		50	233	188	188	87	65
13	90	43		50	188	162	162	81	65
14	90	43		110	150	175	162	75	65
15	122	43		164	202	188	150	65	65
16	110			122	249	188	139	61	70
17	110			122	150	217	139	57	70
18	110			164	150	233	217	57	70
19	99			179	162	217	397	57	70
20	99			179	162	217	338	54	70
21	90			360	217	217	283	54	70
22	90		90	360	301	188	233	54	65
23	90		110	380	249	150	188	50	65
24	80		90	395	233	139	175	45	61
25	90		80	410	233	162	162	45	61
26	80		72	196	283	249	150	45	57
27	72		72	164	266	357	150	42	57
28	72		72	149	217	283	162	42	57
29	72		72	164	217	249	175	42	61
30	80		72	179	217	217	139	45	70
31			65		202		139	48	

NOTE.—Discharge ascertained as follows: Nov. 1 to Apr. 30 from a curve well defined between 35 and 150 second-feet; May 10 to Sept. 30 from a rating curve well defined between 50 and 250 second-feet and poorly defined for other discharges; discharge Apr. 23-24 interpolated; estimated May 1-9, as stage discharge relation was probably affected by logs lodging on a beaver dam below gage.

Monthly discharge of Crow Creek at Lozeau's ranch, near Ronan, Mont., for the year ending Sept. 30, 1915.

Month.	Discharge in second-feet.			Run-off (total in acre-feet).	Accuracy.
	Maximum.	Minimum.	Mean.		
October			105	6,460	
November	179	72	101	6,010	D.
December 1-15	80	43	55.5	1,650	C.
March 22-31	110	65	79.5	1,580	C.
April	410	53	153	9,100	C.
May	301	150	209	12,900	B.
June	357	139	206	12,300	B.
July	397	139	187	11,500	A.
August	123	42	72.1	4,430	A.
September	70	50	62.1	3,700	B.

NOTE.—During October stage-discharge relation affected by backwater from a beaver dam; mean flow estimated. Diversions were made above the station as follows: From Mud Creek: May, 545 acre-feet; June, 555 acre-feet; July, 246 acre-feet; August, 47 acre-feet. From North Fork of Crow Creek: May, 2,984 acre-feet; June, 1,626 acre-feet; August, 346 acre-feet. From Crow Creek just above Lozeau's house: May, 239 acre-feet; June, 680 acre-feet; July, 1,789 acre-feet; August, 828 acre-feet; September, 285 acre-feet. Total quantity diverted above station for October, 3,940 acre-feet. Accuracy of determinations for June and September lowered by possible errors in gage readings.

MISSION CREEK NEAR ST. IGNATIUS, MONT.

Location.—In the SW. ¼ sec. 10, T. 18 N., R. 20 W., near the house of T. L. Cope, about a mile downstream from St. Ignatius, in Missoula County.

Drainage area.—Not measured.

Records available.—September 21, 1906, to September 30, 1915.

Gage.—Vertical staff on the left bank about 500 feet below house of T. L. Cope; read two to three times a week in November, December, July, August, and September, and four to five times a week in other months. Original gage was destroyed July 5, 1907, and a new gage was installed July 24 a short distance downstream at a datum 0.30 foot lower. January 25, 1908, this gage was lowered 0.39 foot. The gage was again destroyed June 7, 1908, and on June 26 a vertical staff gage was installed 20 feet farther downstream and at a different datum. January 29, 1912, a chain gage was installed on the left bank about 200 feet above last gage and at a different datum. Present gage installed May 19, 1913, at the same site and datum as the chain gage.

Discharge measurements.—Made by wading or from a bridge 2 miles above the gage.

Channel and control.—Composed of gravel; may shift slightly at high water; current swift. Control not well defined. Left bank high and not subject to overflow; right bank low and subject to overflow only at flood stages.

Extremes of discharge.—Maximum stage recorded during year, 3.6 feet June 26 (discharge, 385 second-feet); minimum stage recorded, 1.7 feet March 16–29 (discharge, 16 second-feet).

1906–1915: Maximum discharge estimated at 2,000 second-feet during period June 7–25, 1908 (gage washed out); minimum stage recorded, 0.2 foot January 30 to February 4, 17–25; March 9–12, 1908; February 28, 1911 (discharge, 8 second-feet).

Winter flow.—Stage-discharge relation affected by ice; record discontinued during winter.

Diversions.—Mission canal, of the United States Reclamation Service, diverts above station. For the amount of diversions during 1915, see footnote to table of mean monthly discharge. There are also several private ditches taking out above the gage.

Regulation.—St. Mary Lake gives a small amount of natural regulation. The snow melting in the mountains causes some diurnal fluctuation during the spring.

Accuracy.—Results good when frequent gage readings are made.

Discharge measurements of Mission Creek near St. Ignatius, Mont., during the year ending Sept. 30, 1915.

[Made by W. A. Lamb.]

Date.	Gage height.	Discharge.
	Feet.	*Sec.-ft.*
Nov. 23	1.93	32
May 10	2.35	81

Daily discharge, in second-feet, of Mission Creek near St. Ignatius, Mont., for the year ending Sept. 30, 1915.

Day.	Oct.	Nov.	Dec.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.
1	43	61	29	....	19	132	201	350	213	111
2	51	61	29	....	19	104	226	346	201	102
3	59	58	29	....	19	76	239	342	189	92
4	68	55	29	....	19	61	252	338	177	87
5	76	52	29	....	19	61	239	334	166	82
6	61	49	29	....	19	61	226	331	154	76
7	54	46	29	....	19	61	226	344	154	72
8	48	42	29	....	19	69	239	358	178	68
9	38	38	29	....	19	77	252	347	201	64
10	38	38	29	....	19	84	226	336	189	61
11	38	38	29	....	24	76	201	325	177	61
12	38	38	29	....	29	102	201	314	166	61
13	38	34	29	....	34	112	201	304	154	61
14	38	29	29	....	38	122	201	331	154	61
15	50	29	29	....	76	111	201	278	156	61
16	61	29	29	16	92	111	201	265	158	61
17	61	29	29	16	92	111	201	252	160	61
18	61	29	29	16	92	122	201	265	162	59
19	61	29	27	16	92	132	201	278	164	56
20	58	29	25	16	102	154	201	278	166	53
21	54	29	23	16	111	177	201	278	168	50
22	48	29	22	16	100	177	214	278	171	48
23	48	29	22	16	88	177	226	272	174	46
24	48	29	22	16	76	177	226	266	177	44
25	48	29	22	16	61	166	358	259	170	42
26	48	29	22	16	61	177	385	252	162	40
27	48	29	22	16	61	144	372	252	154	38
28	52	29	22	16	68	111	358	252	149	38
29	56	29	22	16	76	133	358	252	144	38
30	61	29	22	16	111	155	354	239	138	38
31	61	....	22	16	....	178	....	226	132	....

NOTE.—Discharge ascertained from a well-defined rating curve. Discharge interpolated for days when gage was not read.

Monthly discharge of Mission Creek near St. Ignatius, Mont., for the year ending Sept. 30, 1915.

Month.	Discharge in second-feet.			Run-off (total in acre-feet).	Accuracy.
	Maximum.	Minimum.	Mean.		
October	76	38	52.0	3,200	B.
November	61	29	36.8	2,190	C.
December	29	22	26.4	1,620	B.
March 16-31	16	16	16.0	508	B.
April	111	19	55.8	3,320	B.
May	178	61	120	7,380	C.
June	385	201	246	14,600	C.
July	358	226	295	18,100	C.
August	213	132	167	10,300	C.
September	111	38	61.1	3,640	B.

NOTE.—Water was diverted from Mission Creek above the gage as follows: June, 22 acre-feet; July, 102 acre-feet; August, 560 acre-feet; and September, 326 acre-feet.

DRY CREEK NEAR ST. IGNATIUS, MONT.

Location.—At Felsman's ranch, about 1½ miles below St. Mary Lake, above the only tributary and about 5 miles southeast of St. Ignatius, in Missoula County.

Drainage area.—Not measured.

Records available.—April 16, 1908, to September 30, 1915.

Gage.—Staff gage nailed to tree on left bank opposite Henry Felsman's house; read daily by Theresa Felsman.

Discharge measurements.—Made by wading.

Channel and control.—Channel is composed of coarse gravel and boulders; shifts slightly. Control is not well defined. Banks low but not subject to overflow, as the fall is great.

Extremes of discharge.—Maximum stage recorded during year, 1.70 feet June 25 (discharge, 113 second-feet); minimum stage recorded, 0.1 foot March 20–22 (discharge, 0.5 second-foot).

1908–1915: Water over gage June 6 and 7, 1908 (discharge estimated at 250 second-feet). No flow, November 30, 1908; May 15, 18–21, October 24, November 1–4, 11–15, 17 and 20–30, 1909; April 23, 1910; May 3–7, 1913; April 1–11, 1914.

Winter flow.—No flow at gage during winter and early spring.

Diversions.—One small ditch diverts above the station.

Regulation.—St. Mary Lake forms a natural regulation, Dry Creek carrying simply the overflow. This is the cause of the creek going dry during the winter.

Accuracy.—Results good.

The following discharge measurement was made by W. A. Lamb:

May 9, 1915, gage height 0.70 foot; discharge, 15.4 second-feet.

Daily discharge, in second-feet, of Dry Creek near St. Ignatius, Mont., for the year ending Sept. 30, 1915.

Day.	Oct.	Nov.	Dec.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.
1	3.0	10	6.0	....	5.0	47	52	69	49	16
2	3.0	10	6.0	....	5.0	38	57	67	49	16
3	38	10	6.0	....	6.0	34	57	67	54	16
4	38	10	6.0	....	6.0	30	57	75	47	16
5	38	6.0	6.0	....	10	23	57	78	47	16
6	30	6.0	4.0	....	10	23	67	81	38	16
7	16	6.0	4.0	....	10	17	78	86	38	16
8	10	6.0	4.0	....	10	16	84	78	38	16
9	10	6.0	2.0	....	6.0	16	67	78	30	16
10	10	6.0	2.0	....	6.0	20	57	78	30	16
11	10	6.0	2.0	....	4.0	23	57	78	26	16
12	10	10	2.0	....	6.0	30	47	78	25	16
13	10	10	....	....	16	38	47	69	23	16
14	6.0	10	....	....	16	38	40	67	23	16
15	10	6.0	....	....	16	42	40	67	23	16
16	16	6.0	....	....	23	42	34	67	16	16
17	16	10	....	....	23	40	34	62	20	16
18	23	10	....	....	26	40	62	62	16	16
19	23	10	....	....	30	40	72	57	16	16
20	23	10	....	0.5	38	38	72	57	16	16
21	16	10	....	0.5	38	45	62	57	16	16
22	16	10	....	0.5	38	49	62	62	16	16
23	16	10	....	2.0	44	47	57	62	16	16
24	16	6.0	....	4.0	32	47	84	67	16	14
25	16	6.0	....	6.0	30	47	113	62	16	14
26	10	6.0	....	6.0	30	47	101	57	16	14
27	10	6.0	....	4.4	30	47	78	57	16	16
28	10	6.0	....	4.4	32	40	68	57	16	16
29	10	6.0	....	5.0	30	47	59	52	16	20
30	10	6.0	....	5.0	32	47	62	47	16	20
31	10	....	....	5.6	....	47	....	47	16	....

Note.—Discharge ascertained from a rating curve fairly well defined above and poorly defined below 5 second-feet. Discharge Oct. 1-2 interpolated for lack of gage readings.

Monthly discharge of Dry Creek near St. Ignatius, Mont., for the year ending Sept. 30, 1915.

Month.	Discharge in second-feet.			Run-off (total in acre-feet).	Accuracy.
	Maximum.	Minimum.	Mean.		
October	38	3.0	15.6	959	B.
November	10	6.0	7.87	468	B.
December 1-12	6	2.0	4.17	99.3	C.
March 20-31	6	.5	3.66	87.1	C.
April	44	4.0	20.3	1,210	B.
May	49	16	36.9	2,270	B.
June	113	34	62.8	3,740	B.
July	86	47	66.1	4,060	B.
August	54	16	25.8	1,590	B.
September	20	14	16.1	958	B.

POST CREEK NEAR ST. IGNATIUS, MONT.

LOCATION.—On section line between the SE. ¼ NE. ¼ sec. 23 and the SW. ¼ NW. ¼ sec. 24, T. 19 N., R. 20 W., at the new highway bridge on the stage road between St. Ignatius and Ronan, about a mile below North Fork of Post Creek, and 5 miles north of St. Ignatius, in Missoula County.

DRAINAGE AREA.—Not measured.

RECORDS AVAILABLE.—September 19, 1911, to September 30, 1915. For a station 3 miles above present gage, September 1, 1906, to May 9, 1911, and 1½ miles above the present gage, April 20, 1911, to November 11, 1911. Considerable inflow from springs between the present station and stations above. North Fork of Post Creek also enters between the stations above and the present one.

GAGE.—Chain gage installed on downstream side of highway bridge September 19, 1911; read twice daily by I. H. Lee. Staff gage near the house of J. G. Fitzpatrick, about 2 miles above North Fork of Post Creek, September 1, 1906, to May 9, 1911. Staff gage at Deschamp's ranch, 500 feet above North Fork of Post Creek, April 20, 1911, to November 11, 1911.

DISCHARGE MEASUREMENTS.—Made by wading or from highway bridge.

CHANNEL AND CONTROL.—Gravel and small boulders; free from vegetation; shifting at high stages. Banks fairly high, and not subject to overflow except at flood stages.

EXTREMES OF DISCHARGE.—Maximum stage recorded during year, 4.65 feet at 8 a. m. May 21 (discharge, 501 second-feet); minimum stage recorded, 2.05 feet October 10, 12, 15, 22, and 25 (discharge, 22 second-feet).

1906–1915: Maximum stage recorded, 8.48 feet about June 10, 1908, gage washed out (discharge estimated at 2,200 second-feet); minimum stage recorded, 2.0 feet September 3, 1914 (discharge, 20 second-feet).

WINTER FLOW.—Stage-discharge relation seriously affected by ice; record discontinued during winter.

DIVERSIONS.—Two small ditches divert water above the old station at Fitzpatrick's ranch. The United States Reclamation Service diverts water above station for irrigation and for storage in Ninepipe Reservoir. For diversions in 1915, see footnote to table of monthly discharge.

REGULATION.—McDonalds Lake affords a small amount of natural regulation.

ACCURACY.—Results excellent.

Discharge measurements of Post Creek near St. Ignatius, Mont., during the year ending Sept. 30, 1915.

Date.	Made by—	Gage height.	Discharge.
		Feet.	*Sec.-ft.*
May 10	W. A. Lamb	3.18	136
June 18	.....do	3.55	222
Sept. 15	B. E. Jones	2.71	72

Daily discharge, in second-feet, of Post Creek near St. Ignatius, Mont., for the year ending Sept. 30, 1915.

Day.	Oct.	Nov.	Dec.	Apr.	May.	June.	July.	Aug.	Sept.
1	32	48	66	55	160	225	214	160	95
2	37	44	62	51	151	236	214	170	117
3	40	55	64	59	142	236	214	160	109
4	45	66	59	83	125	260	214	170	95
5	93	62	57	68	102	260	202	160	95
6	51	59	59	72	109	273	214	160	95
7	28	66	52	68	89	236	248	170	95
8	28	81	57	68	89	260	260	151	89
9	26	86	55	63	117	260	273	151	83
10	22	81	46	59	142	236	273	142	83
11	25	86	48	63	202	225	286	142	83
12	22	81	44	72	191	214	236	134	72
13	25	86	44	102	191	191	225	125	72
14	25	86	44	109	225	180	225	142	72
15	22	79	40	102	260	170	202	125	72
16	26	78	....	89	225	180	191	125	72
17	27	71	....	89	191	202	225	125	72
18	34	76	....	102	180	214	273	125	72
19	32	76	....	117	214	214	260	125	72
20	25	71	....	125	236	214	248	134	72
21	26	74	....	142	431	202	225	125	72
22	22	63	....	117	236	180	180	125	72
23	25	76	....	109	214	170	202	125	72
24	25	76	....	109	225	202	214	117	72
25	22	71	....	89	214	286	202	117	72
26	26	76	....	95	225	377	214	109	72
27	30	63	....	83	202	273	214	95	89
28	38	66	....	83	191	225	202	95	134
29	40	66	....	109	202	214	180	95	117
30	40	62	....	134	191	214	180	102	95
31	48	....	....	....	202	....	202	95	....

NOTE.—Discharge ascertained from two well-defined rating curves applicable Oct. 1 to Dec. 15, and Apr. 1 to Sept. 30. Discharge Sept. 13 and 14 interpolated for lack of gage readings.

Monthly discharge of Post Creek near St. Ignatius, Mont., for the year ending Sept. 30, 1915.

Month.	Discharge in second-feet.			Run-off (total in acre-feet).	Accuracy.
	Maximum.	Minimum.	Mean.		
October	93	22	32.5	2,000	A.
November	86	44	71.0	4,220	A.
December 1-15	66	40	53.1	1,580	A.
April	142	51	89.5	5,330	A.
May	431	89	189	11,600	A.
June	377	170	228	13,600	A.
July	286	180	223	13,700	A.
August	170	95	132	8,120	A.
September	134	72	85.1	5,060	A.

NOTE.—Water was diverted from Marsh Creek, a tributary of Post Creek, above the station, as follows: May, 180 acre-feet; June, 377 acre-feet; July, 381 acre-feet; August, 417 acre-feet; September, 346 acre-feet. From Post Creek water was diverted as follows: October, 3,152 acre-feet; November, 436 acre-feet.

SOUTH FORK OF JOCKO RIVER NEAR JOCKO, MONT.

Location.—In the NE. ¼ sec. 35, T. 17 N., R. 18 W., about 300 feet below the junction with the Middle Fork, and about 10 miles northeast of Jocko, in Missoula County.

Drainage area.—Not measured.

Records available.—May 11, 1912, to September 30, 1915.

Gage.—Vertical staff nailed to tree on right bank; read once a week by Tony Delaware.

Discharge measurements.—Made from a foot log about 200 feet below gage or by wading.

Channel and control.—Boulders and cobblestones; fairly permanent. Current swift at all stages. Banks not very high, but not subject to overflow on account of the large fall of the stream.

Extremes of discharge.—Maximum stage recorded during year, 3.1 feet May 22 and June 6 (discharge, 251 second-feet); minimum discharge estimated at 30 second-feet November 22–30 (gage not read).

1912–1915; Maximum stage recorded, 4.15 feet May 31, 1913 (discharge, 1,080 second-feet); minimum stage recorded, 1.93 feet December 7, 1912 (discharge, 29 second-feet). These records are for the open season only.

Winter flow.—Stage-discharge relation probably not seriously affected by ice. It is very difficult to reach the gage during winter on account of snow, and readings are discontinued.

Diversions.—None.

Regulation.—None. The melting snow in the mountains causes a diurnal fluctuation during the spring.

Accuracy.—Results only fair on account of infrequent gage readings.

Discharge measurements of South Fork of Jocko River near Jocko, Mont., during the year ending Sept. 30, 1915.

Date.	Made by—	Gage height.	Discharge.
		Feet.	*Sec.-ft.*
May 6	W. A. Lamb	2.70	126
July 28	do	2.60	114
Sept. 13	B. E. Jones	2.27	59

Daily discharge, in second-feet, of South Fork of Jocko River near Jocko, Mont., for the year ending Sept. 30, 1915.

Day.	Oct.	Nov.	Apr.	May.	June.	July.	Aug.	Sept.
1	54	98	55	170	231	167	105	72
2	53	92	57	164	235	162	104	74
3	52	86	59	158	239	159	103	76
4	58	79	61	151	243	156	101	78
5	64	72	63	144	247	153	100	76
6	70	65	65	137	251	150	99	75
7	76	58	67	144	246	147	98	74
8	82	57	69	150	241	144	97	73
9	89	56	72	157	236	141	96	72
10	96	55	74	164	231	139	94	70
11	105	55	88	171	225	137	92	68
12	114	54	102	178	219	138	90	66
13	124	53	116	185	217	140	88	64
14	134	52	131	192	215	142	86	64
15	144	50	146	199	213	144	84	63
16	154	48	161	206	211	146	83	63
17	164	46	176	213	209	148	82	62
18	163	44	174	220	207	150	81	62
19	162	41	172	227	204	146	80	61
20	160	38	170	235	202	142	78	60
21	158	35	168	243	200	138	76	59
22	156	....	166	251	198	134	74	57
23	154	....	164	247	196	130	72	56
24	152	....	162	243	194	126	71	55
25	145	....	164	239	192	123	70	54
26	138	....	166	234	189	120	68	53
27	131	....	168	229	185	118	66	54
28	124	....	170	224	181	115	65	55
29	117	....	173	219	177	115	66	56
30	110	....	176	223	172	106	68	56
31	104	....	....	227	....	106	70	....

NOTE.—Discharge ascertained as follows: Oct. 1 to Nov. 21, from a rating curve well defined above and poorly defined below 35 second-feet; Apr. 1 to Sept. 30 from a fairly well defined rating curve. Gage read once a week; discharge interpolated for intervening periods; discharge Nov. 22–30, estimated 30 second-feet for lack of gage readings.

Monthly discharge of South Fork of Jocko River near Jocko, Mont., for the year ending Sept. 30, 1915.

Month.	Discharge in second-feet.			Run-off (total in acre-feet).	Accuracy.
	Maximum.	Minimum.	Mean.		
October	164	52	116	7,130	D.
November	98	....	50.1	2,980	D.
April	176	55	125	7,440	C.
May	251	137	198	12,200	D.
June	251	172	214	12,700	C.
July	167	106	138	8,480	C.
August	105	65	84.1	5,170	C.
September	78	53	64.3	3,830	C.

JOCKO RIVER NEAR JOCKO, MONT.

LOCATION.—At highway bridge about 1¼ miles north of Jocko Agency, and 3½ miles east of Arlee, in Missoula County. It is below Big Knife and above Finley, and Valley creeks.

DRAINAGE AREA.—Not measured.

RECORDS AVAILABLE.—August 20, 1908, to September 30, 1915.

GAGE.—Vertical staff attached to middle pier of highway bridge, on downstream side; read once a week by Tony Delaware.

DISCHARGE MEASUREMENTS.—Made by wading or from highway bridge. Prior to 1914 high-water measurements were made at a foot log a mile above the gage where the measuring section was better.

Channel and control.—Channel composed of boulders and gravel; practically permanent. Bed is very rough at the gage and the water is swift. Banks high and not subject to overflow.

Extremes of discharge.—Maximum stage recorded during year, 8.65 feet June 5 (discharge, 625 second-feet); minimum discharge estimated at 95 second-feet, October 1 (gage not read).

1906–1915: Maximum stage recorded, 12.25 feet (obtained from high-water marks) June 6, 1908 (discharge, 6,200 second-feet, determined from floats); minimum stage recorded, 6.86 feet July 31, 1914 (discharge 53 second-feet). Minimum flow of July 31, 1914, was due to diversion above.

These records are for the open season. Only estimates of mean monthly flow are available for the winter.

Winter flow.—Stage-discharge relation not seriously affected by ice. Gage readings are discontinued during winter, as the water is used only for irrigation and the winter flow is not considered important.

Diversions.—Jocko canal diverts about 2 miles above station, and Big Knife canal diverts from Big Knife Creek. See footnote to table of monthly discharge for diversions in 1915.

Regulation.—Jocko Lakes furnish a small amount of natural regulation. The melting snow in the mountains causes a diurnal fluctuation during the spring.

Accuracy.—Records are only fair on account of infrequent gage readings.

The following discharge measurement was made by W. A. Lamb:

November 24, 1914: Gage height, 7.38 feet; discharge, 132 second-feet.

Daily discharge, in second-feet, of Jocko River near Jocko, Mont., for the year ending Sept. 30, 1915.

Day.	Oct.	Nov.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.
1	95			134	347	581	355	211	156
2	96			147	356	592	348	199	159
3	98			160	371	603	341	188	162
4	100			173	383	614	334	176	162
5	102			186	395	625	327	164	162
6	104			199	407	618	320	152	162
7	117			212	419	611	313	151	162
8	130			225	430	604	306	150	162
9	142			238	439	597	298	149	163
10	152			250	448	591	309	148	162
11	162			290	457	585	320	146	163
12	173			330	466	563	330	144	164
13	184			370	475	540	340	142	165
14	201			415	484	518	350	144	167
15	218			460	493	496	360	146	169
16	235			505	502	474	370	148	171
17	217			550	510	452	380	149	173
18	199			515	518	430	360	150	171
19	181			480	526	427	340	151	170
20	162			440	534	425	320	152	169
21				400	542	422	305	151	168
22				360	550	419	285	150	167
23				320	550	416	265	149	166
24		132		280	550	413	261	148	164
25				289	550	410	257	146	162
26			119	298	550	407	253	144	154
27			121	307	550	405	249	142	146
28			124	316	550	392	245	144	138
29			126	325	550	380	240	147	130
30			129	335	560	368	235	150	122
31			131		570		223	153	

Note.—Discharge ascertained from a fairly well defined rating curve. Discharge October 21-31, estimated for lack of gage readings, 255 second-feet. Gage read once a week; discharge interpolated for intervening periods.

Monthly discharge of Jocko River near Jocko, Mont., for the year ending Sept. 30, 1915.

Month.	Discharge in second-feet.			Run-off (total in acre-feet).	Accuracy.
	Maximum.	Minimum.	Mean.		
October	....	95	189	11,600	D.
March 26–31	131	119	125	1,490	C.
April	550	134	317	18,900	D.
May	570	347	485	29,800	D.
June	625	368	499	29,700	C.
July	380	223	308	18,900	C.
August	211	142	154	9,470	C.
September	173	122	160	9,520	C.

NOTE.—Water was diverted from Jocko River above the gage as follows: May, 753 acre-feet; June, 855 acre-feet; July, 558 acre-feet; August, 1,876 acre-feet; September, 276 acre-feet. Water was diverted from Big Knife Creek, a tributary entering Jocko River above the gage, as follows: June, 375 acre-feet; July, 1,093 acre-feet; August, 201 acre-feet.

MIDDLE FORK OF JOCKO RIVER NEAR JOCKO, MONT., 1915.

LOCATION.—Near the north line of sec. 35, T. 17 N., R. 18 W., Montana meridian, about 300 feet above junction with the South Fork, and about 10 miles northeast of Jocko, in Missoula County.

DRAINAGE AREA.—Not measured.

RECORDS AVAILABLE.—May 1, 1912, to September 30, 1915.

GAGE.—Vertical staff nailed to log on right bank; read once a week by Tony Delaware.

DISCHARGE MEASUREMENTS.—Made from a foot log at the gage or by wading.

CHANNEL AND CONTROL.—Gravel and cobblestones; practically permanent. Banks fairly high and not subject to overflow. Some moss grows on the bottom during the summer but probably has little effect.

EXTREMES OF DISCHARGE.—Maximum stage recorded during year 1.07 feet October 17 and April 30 (discharge, 47 second-feet); minimum stage recorded, 0.4 foot December 12 (discharge, 9 second-feet); open-season records only.

1912–1915: Maximum stage recorded, 1.4 feet June 1, 1912 (discharge, 134 second-feet); minimum stage recorded, 0.45 foot December 13, 1913 (discharge, 8 second-feet); open-season records only.

WINTER FLOW.—Stage-discharge relation probably not seriously affected by ice. It is very difficult to reach the gage during winter on account of snow, and readings are discontinued.

DIVERSIONS.—No diversions.

REGULATION.—None. The melting snow in the mountains causes a diurnal fluctuation during the spring months.

ACCURACY.—Results only fair on account of infrequent gage readings.

Discharge measurements of Middle Fork of Jocko River near Jocko, Mont., during the year ending Sept. 30, 1915.

Date.	Made by—	Gage height.	Discharge.
		Feet.	*Sec.-ft.*
May 6	W. A. Lamb	0.87	33.6
July 28	....do	.77	30.5
Sept. 13	B. E. Jones	.61	17.4

Daily discharge, in second-feet, of Middle Fork of Jocko River near Jocko, Mont., for the year ending Sept. 30, 1915.

Day.	Oct.	Nov.	Dec.	Apr.	May.	June.	July.	Aug.	Sept.
1	18	25	10	18	45	37	37	30	22
2	18	24	10	18	43	37	37	30	23
3	18	23	10	19	41	38	37	29	24
4	19	23	10	19	38	39	37	28	24
5	20	22	10	20	35	39	36	27	24
6	21	21	10	20	33	39	35	26	24
7	23	20	10	21	32	39	34	26	24
8	25	19	10	21	31	38	33	26	22
9	27	18	9	22	31	37	32	26	22
10	29	17	9	22	32	37	32	26	22
11	31	15	9	25	33	36	32	25	22
12	33	14	9	28	34	36	32	26	20
13	35	13	....	31	35	36	33	24	18
14	38	12	....	34	36	36	34	24	19
15	41	12	....	37	37	36	35	24	20
16	44	12	....	40	37	35	36	24	21
17	47	12	....	43	38	35	37	23	22
18	46	12	....	43	39	35	38	22	23
19	45	12	....	42	40	35	38	21	23
20	44	12	....	41	41	35	37	21	23
21	43	12	....	41	42	35	36	21	22
22	42	12	....	40	42	35	35	21	22
23	41	12	....	39	41	36	34	21	21
24	40	12	....	39	40	36	34	21	20
25	38	10	....	40	39	36	33	20	20
26	36	10	....	41	39	36	32	20	20
27	34	10	....	42	38	36	31	20	20
28	32	10	....	44	37	36	30	20	20
29	30	10	....	46	36	36	30	20	20
30	28	10	....	47	36	37	30	21	20
31	26	....	....	....	36	....	30	22	....

NOTE.—Discharge ascertained as follows: Oct. 1 to June 14, and Aug. 16 to Sept. 30, from a rating curve well defined above 15 second-feet; June 15 to Aug. 15, by indirect method for shifting control. Gage read once a week; discharge interpolated for intervening periods.

Monthly discharge of Middle Fork of Jocko River, near Jocko, Mont., for the year ending Sept. 30, 1915.

Month.	Discharge in second-feet.			Run-off (total in acre-feet).	Accuracy.
	Maximum.	Minimum.	Mean.		
October	47	18	32.7	2,010	C.
November	25	10	14.9	887	C.
December 1-12	10	9	9.7	231	C.
April	47	18	32.8	1,950	C.
May	45	31	37.3	2,290	D.
June	39	35	36.5	2,170	C.
July	38	30	34.1	2,100	C.
August	30	20	23.6	1,450	C.
September	24	18	21.6	1,290	C.

NORTH FORK OF JOCKO RIVER NEAR JOCKO, MONT., 1915.

LOCATION.—In the NW. ¼ sec. 23, T. 17 N., R. 18 W., three-fourths mile above the Junction with Falls Creek, and about 11 miles northeast of Jocko, in Missoula County.

DRAINAGE AREA.—Not measured.

RECORDS AVAILABLE.—May 1, 1912, to September 30, 1915.

GAGE.—Vertical staff nailed to tree on left bank; read once a week by Tony Delaware.

DISCHARGE MEASUREMENTS.—Made from a foot log about 100 feet above gage or by wading.

Channel and control.—Boulders and cobblestones; practically permanent. Water swift at all stages but the gage is set in a deep quiet pool. Banks fairly high and not subject to overflow.

Extremes of discharge.—Maximum stage recorded during year, 2.35 feet April 17 (discharge, 198 second-feet); minimum stage recorded, 0.87 foot December 12 (discharge, 15 second-feet).

1912–1915: Maximum stage recorded, 3.4 feet May 31, 1913 (discharge, 492 second-feet); minimum stage recorded, 0.55 foot December 13, 1913 (discharge, 6 second-feet). These records are for the open season only.

Winter flow.—Stage-discharge relation probably not seriously affected by ice. It is very difficult to reach the gage during winter on account of snow and readings are discontinued.

Diversions.—None.

Regulation.—None. The melting snow in the mountains causes some diurnal fluctuation during the spring months.

Accuracy.—Results only fair on account of infrequent gage readings.

Discharge measurements of North Fork of Jocko River near Jocko, Mont., during the year ending Sept. 30, 1915.

[Made by W. A. Lamb.]

Date.	Gage height.	Discharge.
	Feet.	*Sec.-ft.*
May 6	1.75	88
July 28	1.33	41

Daily discharge, in second-feet, of North Fork of Jocko River near Jocko Mont., for the year ending Sept. 30, 1915.

Day.	Oct.	Nov.	Dec.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.
1	16	60	17		31	147	170	90	39	20
2	16	56	16		32	136	171	84	38	21
3	16	52	16		33	125	172	83	36	21
4	18	48	16		35	114	173	82	34	21
5	20	44	16		37	103	175	81	32	21
6	23	40	16		39	92	177	81	30	21
7	26	37	16		41	120	164	80	28	22
8	28	35	16		43	148	151	79	26	22
9	30	33	15		45	151	138	78	26	23
10	33	31	15		47	154	125	77	26	23
11	43	29	15		68	157	112	76	25	23
12	53	28	15		90	160	99	79	24	24
13	64	27			112	163	99	82	24	25
14	74	26			134	166	99	85	24	26
15	85	26			156	169	99	88	24	27
16	95	25			177	172	99	91	24	28
17	106	24			198	175	99	94	23	29
18	103	23			191	178	99	96	22	31
19	100	22			184	181	99	88	21	31
20	97	21			177	183	101	80	21	31
21	94	21			170	185	103	72	21	30
22	90	21			163	187	105	64	21	30
23	87	20			156	184	108	56	21	29
24	84	19			148	181	111	47	20	28
25	81	19			149	178	114	45	19	28
26	78	18		31	151	175	117	43	18	28
27	75	17		31	153	172	112	41	18	28
28	72	17		31	155	169	107	40	18	28
29	70	17		31	157	167	102	40	18	28
30	67	17		31	158	168	96	40	18	27
31	64			31		169		40	19	

Note.—Discharge ascertained from a well-defined rating curve. Gage read once a week; discharge interpolated for intervening periods.

Monthly discharge of North Fork of Jocko River near Jocko, Mont., for the year ending Sept. 30, 1915.

Month.	Discharge in second-feet.			Run-off (total in acre-feet).	Accuracy.
	Maximum.	Minimum.	Mean.		
October	106	16	61.5	3,780	D.
November	60	17	29.1	1,730	C.
December 1-12	17	15	15.8	376	C.
March 26-31	31	31	31.0	369	C.
April	198	31	114	6,780	C.
May	187	93	159	9,780	D.
June	177	96	123	7,320	C.
July	96	40	71.0	4,370	C.
August	39	18	24.5	1,510	C
September	31	20	25.8	1,540	C.

FALLS CREEK NEAR JOCKO, MONT.

LOCATION.—In the NE. ¼ sec. 22, T. 17 N., R. 18 W., about a quarter of a mile above junction with North Fork of Jocko River and 10 miles northeast of Jocko, Missoula County.

DRAINAGE AREA.—Not measured.

RECORDS AVAILABLE.—May 11, 1912, to September 30, 1915.

GAGE.—Staff gage nailed to tree on right bank about a quarter of a mile above junction with North Fork of Jocko River; read once a week by Tony Delaware.

DISCHARGE MEASUREMENTS.—Made by wading. Section is only fair.

CHANNEL AND CONTROL.—Channel gravel, cobblestones, and boulders. Stream consists of a succession of pools, waterfalls, and rapids. Gage is in a pool above a small fall. Control is an irregular rocky ledge, strewn with rocks and gravel, shifts slightly at high water.

EXTREMES OF DISCHARGE.—Maximum stage recorded during year, 1.00 foot May 8 (discharge, 60 second-feet); minimum stage recorded, 0.00 December 12 (discharge, 1.5 second-feet).

1912–1915: Maximum stage recorded, 1.5 feet May 31 and June 1, 1912 (discharge, 89 second-feet); minimum stage recorded zero on gage November 29 and December 6, 1913 (discharge, 1.0 second-foot).

WINTER FLOW.—Stage-discharge relation probably affected by ice. Record discontinued during winter as it is impossible to reach gage on account of snow.

DIVERSIONS.—No diversions.

REGULATION.—No regulation, but the melting snow causes a diurnal fluctuation during the spring.

ACCURACY.—Gage-height record fair; rating curve for October to December well defined above 4 second-feet; March to September, fairly well defined up to 25 second-feet; results fair for November, December, March, July, and August, and poor for remainder of year.

Discharge measurements of Falls Creek near Jocko, Mont., during the year ending Sept. 30, 1915.

Date.	Made by—	Gage height.	Discharge.
		Feet.	*Sec.-ft.*
May 6	W. A. Lamb	0.52	16.9
July 28	....do	.43	12.6
Sept. 13	B. E. Jones	.28	5.8

Daily discharge, in second-feet, of Falls Creek near Jocko, Mont., for the year ending Sept. 30, 1915.

Day.	Oct.	Nov.	Dec.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.
1	5.5	9.8	3.8	....	3.8	40	52	25	14	4.0
2	5.2	9.6	3.7	....	4.3	36	53	23	14	4.2
3	4.8	9.4	3.7	....	4.8	32	54	23	13	4.4
4	5.5	9.2	3.7	....	5.3	28	55	23	12	4.6
5	6.2	9.0	3.7	....	5.8	23	56	23	12	5.7
6	6.9	8.8	3.4	....	6.3	18	58	22	11	6.8
7	7.6	8.5	3.1	....	6.8	39	53	21	10	7.9
8	8.3	8.1	2.8	....	7.3	60	48	20	9.6	8
9	9	7.7	2.5	....	7.8	59	43	20	9.0	9
10	10	7.3	2.2	....	8.3	58	37	20	8.4	10
11	13	6.9	1.8	....	16	57	31	20	7.8	12
12	16	6.5	1.5	....	23	56	25	21	7.1	9
13	19	6.1	....	....	30	55	29	22	6.4	6.0
14	22	5.8	....	....	37	54	33	24	5.7	8
15	25	5.6	....	....	44	53	37	26	5.5	10
16	28	5.4	....	....	51	52	41	27	5.3	12
17	31	5.3	....	....	58	51	45	28	5.1	14
18	30	5.2	....	....	55	50	49	29	4.9	16
19	29	5.1	....	....	52	49	54	28	4.6	16
20	28	5.0	....	....	49	48	51	27	4.3	16
21	26	4.8	....	....	46	47	48	25	4.1	16
22	24	4.6	....	....	43	47	45	23	4.0	15
23	22	4.4	....	....	40	47	42	21	3.9	14
24	20	4.2	....	....	37	47	39	19	3.8	14
25	18	4.1	....	....	38	48	36	17	3.7	14
26	16	4.0	....	4.9	39	48	32	15	3.6	14
27	14	3.9	....	4.7	40	49	30	14	3.5	14
28	13	3.8	....	4.5	41	49	28	13	3.4	14
29	12	3.8	....	4.3	42	49	27	13	3.5	13
30	11	3.8	....	4.1	44	50	26	15	3.6	12
31	10	....	....	3.9	....	51	....	15	3.8	....

NOTE.—Discharge ascertained as follows: Oct. 1 to Dec. 12, from a rating curve well defined above 4 second-feet; Mar. 26 to Sept. 30, from a rating curve fairly well defined below and poorly defined above 25 second-feet. Gage read once a week; discharge interpolated for intervening periods.

Monthly discharge of Falls Creek near Jocko, Mont., for the year ending Sept. 30, 1915.

Month.	Discharge in second-feet.			Run-off (total in acre-feet).	Accuracy.
	Maximum.	Minimum.	Mean.		
October	31	4.8	16.0	984	D.
November	9.8	3.8	6.19	368	C.
December 1-12	3.8	1.5	2.99	71.2	C.
March 26-31	4.9	3.9	4.40	52.4	C.
April	58	3.8	29.5	1,760	D.
May	60	18	46.8	2,880	D.
June	58	25	41.9	2,490	D.
July	29	13	21.4	1,320	C.
August	14	3.4	6.79	418	C.
September	16	4.0	10.8	643	D.

BIG KNIFE CREEK NEAR JOCKO, MONT.

LOCATION.—In the NW. ¼ sec. 14, T. 16 N., R. 19 W., just above head gates of Big Knife canal, about 2½ miles northeast of Jocko, in Missoula County.

DRAINAGE AREA.—Not measured.

RECORDS AVAILABLE.—August 5, 1910, to September 30, 1015, at present station; August 19, 1908, to December 31, 1910, for station about a mile farther downstream.

GAGE.—Staff gage on right bank about 200 feet above head gate of canal; read twice a week by Tony Delaware. Staff gage used from August 19, 1908, to December 31, 1910, was about a mile below present gage.

Discharge measurements.—Made by wading.

Channel and control.—Channel composed of gravel and boulders; shifts slightly; slightly obstructed during the summer by a growth of moss at the control. The stream has considerable fall and the current is swift, but there is a pool at the gage.

Extremes of discharge.—Maximum stage recorded during year, 2.82 feet May 24 and June 5 (discharge, 34 second-feet); minimum stage recorded, 2.11 feet October 2 (discharge, 8.5 second-feet).

1910–1015: Maximum stage recorded, 3.15 feet June 14, 1912 (discharge, 50 second-feet); minimum stage recorded, 1.83 feet April 17, 1911 (discharge, 4.3 second-feet.

These records are for the open season only.

Winter flow.—Record discontinued during the winter.

Diversions.—None above the station.

Regulations.—None. The melting snow at the headwaters causes a slight diurnal variation during the spring.

Accuracy.—Results are only fair on account of infrequent gage readings.

Discharge measurements of Big Knife Creek near Jocko, Mont., during the year ending Sept. 30, 1915.

Date.	Made by—	Gage height.	Discharge.
		Feet.	*Sec.-ft.*
May 7	W. A. Lamb	2.21	[a] 12.2
Sept. 14	B. E. Jones	2.28	12.3

[a] Measurement made on the crest of a weir. Results thought to be too great.

Daily discharge, in second-feet, of Big Knife Creek Creek near Jocko, Mont., for the year ending Sept. 30, 1915.

Day.	Oct.	May.	June.	July.	Aug.	Sept.	Day.	Oct.	May.	June.	July.	Aug.	Sept.
1	8.8	......	31	27	20	14	16	14.8	......	31	27	16	12
2	8.5	......	32	27	20	14	17	13.8	......	32	28	16	12
3	9.0	......	33	26	20	14	18	12.8	......	33	28	16	12
4	9.5	......	34	26	19	14	19	11.8	......	33	26	16	12
5	10.1	......	34	26	19	13	20	10.7	......	32	26	16	12
6	10.7	......	33	26	19	13	21	......	......	32	26	16	12
7	11.2	12	31	26	19	13	22	......	......	32	23	15	12
8	11.7	......	30	27	18	13	23	......	......	32	23	15	12
9	12.2	......	29	27	18	13	24	......	34	31	23	15	11
10	12.6	......	30	26	18	13	25	......	33	30	22	15	11
11	13.0	......	31	25	18	13	26	......	32	30	22	14	11
12	13.4	......	31	24	17	12	27	......	31	30	22	14	13
13	13.8	......	30	24	17	12	28	......	30	28	21	14	13
14	13.8	......	30	25	17	12	29	......	30	27	20	13	13
15	14.8	......	30	26	16	12	30	......	30	27	20	13	13
							31	......	30	......	20	13	......

Note.—Discharge ascertained as follows: Oct. 1–20 from a well-defined rating curve; May 24 to Sept. 30 from a fairly well-defined rating curve; gage read twice a week; discharge interpolated for intervening periods; discharge Oct. 21–31, estimated 8 second-feet for lack of gage readings.

Monthly discharge of Big Knife Creek near Jocko, Mont., for the year ending Sept. 30, 1915.

Month.	Discharge in second-feet.			Run-off (total in acre-feet).	Accuracy.
	Maximum.	Minimum.	Mean.		
October	14.8	....	10.5	646	C.
May 24–31	34	30	31.2	495	C.
June	34	27	31,0	1,840	C.
July	28	20	24.7	1,520	C.
August	20	13	16.5	1,010	C.
September	14	11	12.5	744	C.

AGENCY CREEK NEAR JOCKO, MONT.

Location.—Just above the intake of the Matt ditch, about 2 miles east of Jocko, in Missoula County.

Drainage area.—Not measured.

Records available.—August 19, 1908, to September 30, 1915.

Gage.—Staff gage bolted to a large boulder on left bank 300 feet above intake; read twice a week by Tony Delaware. August 19, 1908, to March 31, 1913, staff gage at a different datum about 100 feet below the present gage. The discharge at the two stations is the same. Present gage has been used since April 1, 1913.

Discharge measurements.—Made by wading.

Channel and control.—Channel is composed of boulders and gravel, shifting slightly. The fall is so great that the stream is a succession of small waterfalls. Gage is in a pool just above a small fall. Banks poorly defined but not subject to overflow.

Extremes of discharge.—Maximum stage recorded during the year, 2.40 feet June 5 (discharge, 50 second-feet). Minimum discharge, 5.6 second-feet October 1 (gage not read, discharge interpolated).

1908–1915: Maximum stage recorded, 2.57 feet June 3, 1909 (discharge, 104 second-feet); minimum stage recorded, 1.38 feet December 12, 1913 (discharge, 2.0 second-feet). These records are for the open season only.

Winter flow.—Record discontinued during winter.

Diversions.—None above station. The Matt ditch is the largest diverting from the stream; smaller ditches also divert below the station.

Regulation.—None. The melting snow at the headwaters causes a slight diurnal fluctuation at certain seasons.

Accuracy.—Results only fair on account of infrequent gage readings.

Discharge measurements of Agency Creek near Jocko, Mont., during the year ending Sept. 30, 1915.

Date.	Made by—	Gage height.	Discharge.
		Feet.	*Sec.-ft.*
May 7	W. A. Lamb	1.98	16.0
Sept. 14	B. E. Jones	1.77	8.0

Daily discharge, in second-feet, of Agency Creek near Jocko, Mont., for the year ending Sept. 30, 1915.

Day.	Oct.	May.	June.	July.	Aug.	Sept.	Day.	Oct.	May.	June.	July.	Aug.	Sept.
1	5.6	......	42	32	18.2	9.0	16	10.6	......	36	42	10.2	8.7
2	6.0	......	44	28	18	10.0	17	9.7	......	34	46	10.5	9.3
3	6.2	......	46	24	17.2	11.0	18	8.8	......	32	46	10.8	9.3
4	6.5	......	48	21	16.4	10.2	19	7.7	......	32	32	11.1	10.2
5	6.8	......	50	17.5	15.6	9.4	20	6.7	......	30	32	11.4	10.2
6	7.0	......	48	23	14.8	8.5	21	......	......	30	32	11.4	9.9
7	7.6	16.9	46	29	14.8	7.6	22	......	......	30	27	10.6	9.6
8	8.2	......	44	35	14.3	7.6	23	......	......	30	27	10.6	9.3
9	8.9	......	41	41	14.3	7.6	24	......	......	31	27	9.8	8.9
10	9.3	......	38	39	13.6	7.6	25	......	......	32	22	9.0	8.5
11	9.8	......	36	37	12.9	7.5	26	......	......	32	22	8.3	11.5
12	10.2	......	36	35	12.2	7.4	27	......	......	32	21	7.6	14.5
13	10.6	......	41	32	11.4	7.4	28	......	39	32	20	7.6	17.5
14	10.6	......	41	35	11.4	7.3	29	......	39	32	19.3	7.0	24
15	10.6	......	38	39	10.2	8.0	30	......	39	32	18.6	7.0	31
							31	......	39	......	18.4	8.0	......

NOTE.—Discharge ascertained as follows: Oct. 1–20, from a well-defined rating curve; May 28 to Sept. 30, from a fairly well-defined rating curve. Gage read twice a week; discharge interpolated for intervening periods.

Monthly discharge of Agency Creek near Jocko, Mont., for the year ending Sept. 30, 1915.

Month.	Discharge in second-feet.			Run-off (total in acre-feet).	Accuracy.
	Maximum.	Minimum.	Mean.		
October 1–20	10.6	5.6	8.37	332	C.
June	50	30	37.2	2,210	C.
July	46	17.5	29.7	1,830	C.
August	18.2	7.0	11.8	726	C.
September	31.0	7.3	10.6	631	C.

FINLEY CREEK NEAR JOCKO, MONT.

LOCATION.—In sec. 31. T. 16 N., R. 19 W., at a ford about 100 feet above highway bridge, about one-eighth mile below the junction of East and West forks, 4 miles southwest of Jocko, and 5 miles southeast of Arlee, in Missoula County.

DRAINAGE AREA.—Not measured.

RECORDS AVAILABLE.—August 19, 1908, to September 30, 1915.

GAGE.—Vertical staff nailed to tree on right bank 100 feet above highway bridge; read twice a week by Tony Delaware.

DISCHARGE MEASUREMENTS.—Made by wading.

CHANNEL AND CONTROL.—Channel composed of gravel and small boulders; fairly permanent. Current swift; control not well defined. Banks of moderate height not subject to overflow.

EXTREMES OF DISCHARGE.—Maximum stage recorded during year, 2.01 feet June 5 (discharge, 95 second-feet); minimum discharge estimated at 6 second-feet October 1 (gage not read).

1909–1915: Maximum stage recorded, 2.3 June 3, 1909 (discharge, 269 second-feet); minimum stage recorded, 0.95 foot December 12, 1913 (discharge, 4.5 second-feet).

WINTER FLOW.—Record discontinued during winter.

DIVERSIONS.—Indian ditch diverts water from East Finley Creek just below station on that stream. A United States Reclamation Service ditch also diverts water from both branches, during the irrigation season, but was not used in 1915.

Regulation.—None. The melting snow causes a small diurnal fluctuation during the spring.

Accuracy.—Results only fair on account of infrequent gage readings.

Discharge measurements of Finley Creek near Jocko, Mont., during the year ending Sept. 30, 1915.

Date.	Made by—	Gage height.	Discharge.	Date.	Made by—	Gage height.	Discharge.
		Feet.	*Sec.-ft.*			*Feet.*	*Sec.-ft.*
Nov. 24	W. A. Lamb	1.35	12.6	July 29	W. A. Lamb	1.57	30
May 7	.....do	1.56	31	Sept. 14	B. E. Jones	1.31	8.5
June 17	.....do	1.86	70				

Daily discharge, in second-feet, of Finley Creek near Jocko, Mont., for the year ending Sept. 30, 1915.

Day.	Oct.	May.	June.	July.	Aug.	Sept.	Day.	Oct.	May.	June.	July.	Aug.	Sept.
1	6.0	......	84	40	24	9.4	16	14.8	......	71	55	12.4	9.2
2	6.2	......	86	36	24	10.2	17	12.7	......	71	61	12.4	9.2
3	6.5	......	89	32	24	11.1	18	10.6	......	71	53	12.1	9.2
4	6.8	......	92	28	23	10.2	19	8.5	......	71	44	11.8	9.2
5	7.2	......	95	23	23	9.4	20	6.4	......	64	35	11.8	9.2
6	7.5	......	92	28	23	8.6	21	......	......	64	35	11.8	8.9
7	7.5	30	89	34	23	7.8	22	......	......	62	40	11.1	8.6
8	9.3	......	86	39	21	7.8	23	......	......	60	40	11.1	8.2
9	9.3	......	82	44	21	8.2	24	......	91	58	40	10.3	7.8
10	10.4	......	85	42	19	8.2	25	......	89	56	34	9.5	7.4
11	11.5	......	88	40	17	8.7	26	......	87	53	34	8.7	9.1
12	12.6	......	88	38	15	9.2	27	......	85	50	34	7.8	10.8
13	13.6	......	88	37	12.4	9.8	28	......	82	46	31	7.8	12.4
14	13.6	......	88	43	12.4	10.4	29	......	82	43	31	7.8	13.2
15	14.8	......	88	49	12.4	10.4	30	......	82	42	30	7.8	14.0
							31	......	82	......	30	8.6	......

Note.—Discharge ascertained as follows: Oct. 1 to June 20, from a rating curve well defined up to 80 second-feet; June 21 to Sept. 30, from a rating curve fairly well defined up to 80 second-feet. Gage read twice a week; discharge interpolated for intervening periods.

Monthly discharge of Finley Creek near Jocko, Mont., for the year ending Sept. 30, 1915.

Month.	Discharge in second-feet.			Run-off (total in acre-feet).	Accuracy.
	Maximum.	Minimum.	Mean.		
October 1-20	14.8	6.0	9.79	388	C.
May 24-31	91	82	85.0	1,350	C.
June	95	42	73.4	4,370	C.
July	61	23	38.1	2,340	C.
August	24	7.8	14.7	904	C.
September	14	7.4	9.53	567	C.

EAST FINLEY CREEK NEAR JOCKO, MONT.

Location.—Near the south line of sec. 32, T. 16 N., R. 19 W., just above the intake of Indian ditch, and about 200 feet below the crossing of the United States Reclamation Service canal, 4 miles southwest of Jocko, and 6 miles southeast of Arlee, in Missoula County.

Drainage area.—Not measured.

Records available.—August 18, 1908, to July 31, 1911; January 31, 1912, to September 30, 1915.

Gage.—Vertical staff nailed to tree on left bank, about 100 feet above the headworks of Indian ditch; read twice a week by Tony Delaware.

Discharge measurements.—Made by wading.

Channel and control.—Channel composed of gravel and small boulders, practically permanent; banks high, not subject to overflow; current swift at all stages. On account of the fall, the dam at the head of Indian ditch has little or no effect.

Extremes of discharge.—Maximum stage recorded during year, 2.40 feet May 24 and June 5 (discharge, 71 second-feet); minimum discharge estimated at 5.0 second-feet October 25–31 (gage not read).

1909–1915: Maximum stage recorded, 2.84 feet June 3, 1909 (discharge, 132 second-feet); minimum stage recorded, 1.23 feet April 2, 1912 (discharge, 2.5 second-feet). These records are for the open season.

Winter flow.—Record discontinued during winter.

Diversions.—Indian ditch, heading below the station, takes practically the entire low-water flow. The United States Reclamation Service canal, crossing above the station, can divert the entire flow, but was not operated during the 1915 season.

No record was kept at this station in 1911 after July 31, as practically the entire flow was being diverted by this Reclamation Service canal.

Regulation.—None. The melting snow causes a small diurnal fluctuation during the spring months.

Accuracy.—Results only fair on account of infrequent gage readings.

Discharge measurements of East Finley Creek near Jocko, Mont., during the year ending Sept. 30, 1915.

Date.	Made by—	Gage height.	Discharge.	Date.	Made by—	Gage height.	Discharge.
		Feet.	*Sec.-ft.*			*Feet.*	*Sec.-ft.*
Nov. 24	W. A. Lamb	1.43	6.0	June 17	W. A. Lamb	2.15	45
May 7	.....do	1.75	15.9	Sept. 14	B. E. Jones	1.55	8.1

Daily discharge, in second-feet, of East Finley Creek near Jocko, Mont., for the year ending Sept. 30, 1915.

Day.	Oct.	May.	June.	July.	Aug.	Sept.	Day.	Oct.	May.	June.	July.	Aug.	Sept.
1	6.0	......	52	24	16	8	16	16	......	45	49	9.7	8.8
2	6.2	......	56	23	16	9	17	14	......	45	55	9.5	8.8
3	6.2	......	61	22	16	10	18	12	......	50	47	9.3	8.8
4	6.8	......	66	21	15	10	19	11	......	50	39	9.1	9.1
5	7.3	......	71	20	14	9	20	9.8	......	48	31	8.8	9.1
6	7.3	......	67	23	14	7.9	21	8.8	......	48	31	8.8	8.8
7	7.3	......	63	26	14	7.9	22	7.8	......	44	25	8.5	8.5
8	12	......	59	30	13	7.9	23	6.8	......	40	25	8.5	8.2
9	12	......	55	34	13	7.9	24	5.7	71	36	25	8.3	7.9
10	12	......	52	33	12	7.9	25	......	65	32	21	8.0	7.6
11	13	......	48	32	11	7.9	26	......	59	28	21	7.8	7.6
12	14	......	48	30	10	7.9	27	......	52	25	21	7.6	14
13	14	......	50	28	10	7.9	28	......	45	24	19	7.4	14
14	14	......	50	35	10	7.9	29	......	45	24	17	7.2	14
15	16	......	50	42	9.7	7.9	30	......	48	24	17	7.0	14
							31	......	48	......	17	7.0	......

Note.—Discharge ascertained from well-defined rating curves applicable Oct. 1–24 and May 24 to Sept 30. Gage read twice a week; discharge interpolated for intervening periods; discharge Oct. 25–31, estimated 5 second-feet for lack of gage readings.

Monthly discharge of East Finley Creek near Jocko, Mont., for the year ending Sept. 30, 1915.

Month.	Discharge in second-feet.			Run-off (total in acre-feet).	Accuracy.
	Maximum.	Minimum.	Mean.		
October	16	....	9.06	557	C.
May 24-31	71	45	54.1	858	C.
June	71	24	47.0	2,800	C.
July	55	17	28.5	1,750	C.
August	16	7.0	10.5	646	C.
September	14	7.6	9.14	544	C.

INDIAN DITCH NEAR JOCKO, MONT.

Location.—Near the south line of sec. 32, T. 16 N., R. 19 W., 200 feet below the intake on East Finley Creek, 4 miles southwest of Jocko, and 6 miles southeast of Arlee, in Missoula County. The intake is 100 feet below the gage on East Finley Creek and 300 feet below the crossing of the United States Reclamation Service canal on East Finley Creek.

Records available.—August 18, 1908, to July 31, 1911; January 31, 1912, to September 30, 1915.

Gage.—Vertical staff nailed to tree on left bank, 100 feet below the intake, installed May 14, 1913, read twice a week by Tony Delaware. August 18, 1908, to May 13, 1913, vertical staff nailed to the headworks 200 feet above present gage and at different datum.

Discharge measurements.—Made by wading.

Regulation.—The flow is regulated by the height of the diversion dam, there being no headgate.

Accuracy.—Results only fair on account of shifting control and infrequent gage readings.

Water is diverted from East Finley Creek mostly for stock water and so runs most of the year. It is also used during the summer for the irrigation of hay lands. Water not used returns to Finley Creek below the station on that stream.

Discharge measurements of Indian ditch near Jocko, Mont., during the year ending Sept. 30, 1915.

Date.	Made by—	Gage height.	Discharge.	Date.	Made by—	Gage height.	Discharge.
		Feet.	*Sec.-ft.*			*Feet.*	*Sec.-ft.*
May 7	W. A. Lamb	1.11	2.8	July 29	W. A. Lamb	1.02	2.9
June 17	do	[a]1.49	8.2	Sept. 14	B. E. Jones	1.32	6.5

[a] Channel below gage obstructed by small dam.

Daily discharge, in second-feet, of Indian ditch near Jocko, Mont., for the year ending Sept. 30, 1915.

Day.	Oct.	May.	June.	July.	Aug.	Sept.	Day.	Oct.	May.	June.	July.	Aug.	Sept.
1	7.4	......	1.8	12.2	2.7	6.7	16	9.8	......	5.7	6.5	8.7	6.6
2	7.5	......	2.1	11.9	2.6	7.3	17	9.2	......	8.3	7.4	7.9	6.6
3	7.6	......	2.5	11.6	2.5	7.9	18	8.6	......	7.4	7.4	7.1	6.6
4	7.7	......	2.9	11.2	2.4	7.5	19	8.0	......	7.4	4.4	6.4	7.0
5	7.8	......	3.3	10.8	2.3	7.0	20	7.3	......	7.2	4.4	5.7	7.0
6	7.9	......	3.3	11.5	2.3	6.5	21		......	7.2	4.4	5.7	6.5
7	7.9	......	3.3	12.3	2.3	6.0	22		......	7.8	4.0	5.5	6.0
8	8.9	......	3.2	13.1	1.9	6.0	23		......	8.4	4.0	5.5	6.0
9	8.9	......	3.2	13.8	1.9	6.0	24		......	9.0	4.0	5.7	5.5
10	8.9	......	2.0	11.4	3.8	6.0	25		......	9.6	3.3	5.9	5.0
11	9.2	......	.8	8.9	5.7	6.3	26		......	10.3	3.3	6.1	7.0
12	9.5	......	.8	6.4	7.6	6.6	27		......	11.0	3.2	6.2	9.0
13	9.5	......	.7	4.0	9.4	6.9	28		1.6	10.9	3.1	6.2	10.6
14	9.5	......	.7	4.8	9.4	7.3	29		1.6	10.8	3.0	5.7	9.6
15	9.8	......	3.2	5.6	8.7	7.3	30		1.5	11.5	2.9	5.7	8.6
							31		1.5	......	2.8	6.2	......

NOTE.—Discharge ascertained as follows: Oct. 1-20, from a well-defined rating curve; May 28 to Sept. 30, by indirect method for shifting control. Gage read twice a week; discharge interpolated for intervening periods; discharge Oct. 21-31, estimated 6.0 second-feet for lack of gage readings.

Monthly discharge of Indian ditch near Jocko, Mont., for the year ending Sept. 30, 1915.

Month.	Discharge in second-feet.			Run-off (total in acre-feet).	Accuracy.
	Maximum.	Minimum.	Mean.		
October	9.8	....	7.64	470	C.
June	11.5	0.7	5.54	330	C.
July	13.8	2.8	7.02	432	C.
August	9.4	1.9	5.35	329	C.
September	10.6	5.0	6.96	414	C.

REVAIS CREEK NEAR DIXON, MONT.

LOCATION.—In T. 18 N., R. 22 W., below highway bridge near residence of A. Bishop, about 4 miles southwest ot Dixon, in Sanders County.

DRAINAGE AREA.—Not measured.

RECORDS AVAILABLE.—April 30, 1911, to September 30, 1915.

GAGE.—Staff gage attached to tree on right bank about 100 feet below a log highway bridge, read to half-tenths twice a day by A. Bishop.

DISCHARGE MEASUREMENTS.—Made by wading or from bridge.

CHANNEL AND CONTROL.—Narrow, with high banks, not subject to overflow; bed composed of small boulders; fairly permanent.

EXTREMES OF DISCHARGE.—Maximum stage recorded during year, 2.73 feet May 22 (discharge, 139 second-feet); minimum stage recorded, 1.3 feet October 1-3, 8-9, 11-13, March 15 and 17 (discharge, 6 second feet).

1911-1915: Maximum stage recorded, 3.5 feet May 27, 1913, (discharge, 336 second-feet); minimum stage recorded, 1.3 feet several times during January, February, August, September, and October, 1914; also twice during March, 1914 and 1915 (discharge, 6 second-feet.)

WINTER FLOW.—Record discontinued during the winter.

DIVERSIONS.—None of importance.

REGULATION.—None. The melting snow causes a small diurnal fluctuation during the spring.

ACCURACY.—Results excellent except for low stages, for which they are good, as reading of gage only to half-tenths at times causes considerable error in determination of discharge.

The following discharge measurement was made by W. A. Lamb:

May 7, 1915: Gage height, 1.98 feet; discharge, 36 second-feet.

Daily discharge, in second-feet, of Revais Creek near Dixon, Mont., for the year ending Sept. 30, 1915.

Day.	Oct.	Nov.	Dec.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.
1	6	14	11	....	11.9	50	61	26	16.0	8.0
2	6	18	11	....	12.5	45	55	26	16.0	8.0
3	6	18	11	....	26	50	61	23	13.4	8.6
4	8	18	11	....	26	40	52	26	14.0	9.5
5	8	18	14	....	23	36	45	20	12.5	8.0
6	8	18	11	....	26	34	50	22	12.5	9.5
7	8	18	8	....	22	28	45	20	12.5	8.0
8	6	14	8	....	23	26	50	20	11.0	7.0
9	6	14	8	....	22	40	42	25	12.5	8.0
10	8	18	11	....	19.0	61	36	23	11.0	7.0
11	6	14	8	....	26	61	48	25	12.5	8.0
12	6	18	8	....	24	55	45	22	11.0	9.5
13	6	18	....	....	32	68	50	18.0	9.5	9.5
14	8	18	....	7.0	45	81	50	20	11.0	11.0
15	11	18	....	6.0	40	67	45	18.0	9.5	9.5
16	8	18	....	7.0	45	74	50	20	11.0	11.0
17	8	14	....	6.0	47	67	43	23	9.5	9.5
18	11	14	....	7.0	59	81	42	20	8.0	8.0
19	14	14	....	7.4	63	89	40	20	9.5	9.5
20	14	18	....	6.4	70	94	32	18.0	8.0	8.0
21	14	14	....	8.9	74	124	36	18.0	9.5	9.5
22	14	14	....	8.6	61	139	34	16.0	9.5	8.0
23	14	14	....	11.9	52	127	32	13.4	8.0	7.0
24	14	14	....	12.5	45	133	29	14.0	9.5	8.0
25	14	18	....	10.4	40	129	30	11.0	8.0	7.0
26	14	14	....	11.0	45	109	40	16.8	9.5	8.0
27	11	12	....	9.5	40	97	36	22	9.5	9.5
28	11	12	....	11.0	45	92	36	18.0	8.0	8.6
29	11	11	....	11.9	48	89	32	20	9.5	12.5
30	14	14	....	9.5	55	67	23	16.0	8.0	12.5
31	11	....	....	11.0	....	67	....	16.0	8.0	....

NOTE.—Discharge ascertained from well-defined rating curve. May 13, gage not read; discharge interpolated.

Monthly discharge of Revais Creek near Dixon, Mont., for the year ending Sept. 30, 1915.

Month.	Discharge in second-feet.			Run-off (total in acre-feet).	Accuracy.
	Maximum.	Minimum.	Mean.		
October	14	6.0	9.8	603	B.
November	18	11.0	15.6	928	B.
December 1-12	14	8.0	10.0	238	B.
March 14-31	12.5	6.0	9.06	323	B.
April	74	11.9	38.9	2,310	A.
May	139	26.0	74.8	4,600	A.
June	61	23.0	42.3	2,520	A.
July	26	11.0	19.9	1,220	A.
August	16	8.0	10.6	652	B.
September	12.5	7.0	8.86	527	B.

THOMPSON RIVER NEAR THOMPSON FALLS, MONT.

Location.—In the SE. ¼ sec. 7, T. 21 N., R. 28 W., at highway bridge, 1 mile above junction with Clark Fork, and 8 miles east of Thompson Falls, in Sanders County.

Drainage area.—601 square miles.

Records available.—February 12, 1911, to September 30, 1915.

Gage.—Vertical staff attached to the right-hand downstream side of center pier; read occasionally by F. E. Brown.

Discharge measurements.—Made from the highway bridge or by wading at the ford 50 feet above bridge.

Channel and control.—Composed of gravel and small rock; practically permanent. Banks high, not suject to overflow.

Extremes of discharge.—Maximum stage recorded during year, 5.0 feet April 17 (discharge, 870 second-feet); minimum stage recorded, 3.82 feet October 7, August 13, 22, 29, September 3, 14 and 16 (discharge, 162 second-feet).

1911–1915: Maximum stage recorded, 7.8 feet May 29, 1913 (discharge, 3,180 second-feet); minimum stage recorded, 3.6 feet December 12, 1913 (discharge, 82 second-feet).

Winter flow.—Seriously affected by surface and anchor ice; record discontinued during winter.

Diversions.—A large flume takes water from the river half a mile above the gage for use in the irrigation of bench lands adjoining Clark Fork between the mouth of Thompson River and Thompson Falls.

Regulation.—None.

Accuracy.—Results good.

Cooperation.—Field data furnished by United States Forest Service.

No discharge measurements made during the year.

Daily discharge, in second-feet, of Thompson River near Thompson Falls, Mont., for the year ending Sept. 30, 1915.

Date.	Discharge.	Date.	Discharge.	Date.	Discharge.
Oct. 7	162	June 12	467	Aug. 22	162
Mar. 20	206	23	183	29	162
Apr. 3	350	28	350	Sept. 3	162
8	407	July 30	254	14	162
17	870	Aug. 7	206	16	162
June 9	437	13	162	21	206

Note.—Discharge ascertained from a fairly well defined rating curve.

PROSPECT CREEK NEAR THOMPSON FALLS, MONT.

Location.—In the NE. ¼ NE. ¼ sec. 18, T. 21 N., R. 29 W., at the first highway bridge over Prospect Creek above the mouth of Dry Creek, about a mile from Thompson Falls, in Sanders County.

Drainage area.—139 square miles.

Records available.—February 12, 1911, to September 30, 1915.

Gage.—Vertical staff attached to a bridge pier; read at irregular intervals by F. E. Brown.

Discharge measurements.—Made by wading 200 feet below the bridge or from bridge.

Channel and control.—Large rocks, very rough, probably permanent; banks high, not subject to overflow.

Extremes of discharge.—Maximum stage recorded during year, 4.7 feet April 18 (discharge, 547 second-feet); minimum stage recorded, 2.0 feet October 28 and November 10 (discharge, 8 second-feet).

1911–1915: Maximum stage recorded, 7.5 feet May 29, 1913 (discharge, 1,860 second-feet); minimum stage recorded, 2.0 feet August 26–27, Ocotber 28 and November 10, 1914 (discharge, 8 second-feet).

These records are for the open season only.

Winter flow.—Stage-discharge relation seriously affected by ice; observations discontinued during winter.

Diversions.—None of importance.

Regulation.—None.

Accuracy.—Results fair.

Cooperation.—Field data furnished by United States Forest Service.

No discharge measurements made during the year.

Daily discharge, in second-feet, of Prospect Creek near Thompson Falls, Mont., for the year ending Sept. 30, 1915.

Date.	Discharge.	Date.	Discharge.	Date.	Discharge.
Oct. 14	12	May 20	178	July 31	17
28	8	June 8	83	Aug. 1	14
Nov. 10	8	17	60	2	14
13	49	18	54	14	20
Feb. 20	23	19	54	16	23
Apr. 1	331	20	49	22	17
16	470	22	39	29	39
17	508	25	39	Sept. 2	17
18	547	July 4	30	18	14
May 8	143	18	23	25	10

Note.—Discharge ascertained from a well-defined rating curve.

PRIEST RIVER AT OUTLET OF PRIEST LAKE, NEAR COOLIN, IDAHO.

Location.—In the SW. ¼ sec. 5, T. 59 N., R. 4 W., at south end of Priest Lake, 2 miles northwest of Coolin, in Bonner County.

Drainage area.—572 square miles.

Records available.—June 18, 1911, to September 30, 1915, fragmentary.

Gage.—April 18, 1913, to November 23, 1914, and August 26 to September 30, 1915, inclined staff gage about 200 feet east of the wharf and 200 feet north of Northern Hotel; read once daily to hundredths by Henry Gable and R. J. Gick. November 24, 1914, to August 25, 1915, Stevens water-stage recorder on right bank 600 feet below outlet of lake; June 18, 1911, to April 6, 1912, and July 13, 1912, to January 8, 1913, two vertical staff gages attached to piers of wharf at Coolin. These gages were not accurately referred to bench marks, and both were torn out by ice.

Discharge measurements.—Prior to September 17, 1913, made from a boat at outlet; after that date made from a cable about 300 feet above gage.

Channel and control.—One channel at all stages, bed, rocky; banks, high. Control probably permanent.

Extremes of discharge.—Maximum stage recorded during year, 3.5 feet May 1–3 (discharge, 2,450 second-feet); minimum stage recorded, 1.48 feet September 21-30 (discharge, 308 second-feet).

1911–1915: Maximum stage recorded, 7.42 feet June 4–6, 1913 (discharge, 5,970 second-feet); minimum stage recorded, 1.54 feet at 6.30 p. m. September 13, 1914 (discharge, 276 second-feet).

Winter flow.—Lake frozen over from about January 1 to April 15. Stage-discharge relation, at outlet, not affected by ice except for short intervals when ice, running out of lake in the spring, jams on rocks below gage.

Diversions.—None.

Regulation.—Natural, in lake.

Accuracy.—A rating curve, well defined below 6,500 second feet, applicable to readings on gage at the outlet has been developed and transferred to readings on inclined gage at Coolin by means of a curve of relation between the two gages. Wind on the lake causes changes in stage at Coolin without corresponding changes at outlet; as the discrepancy may not be compensating, a rating curve based on gage height for inclined gage at Coolin may be considerably in error. Results at outlet excellent; at Coolin lake gage good.

Cooperation.—Gage height record furnished by United States Forest Service.

Discharge measurements of Priest River at outlet of Priest Lake, near Coolin, Idaho, during the year ending Sept. 30, 1915.

Date.	Made by—	Gage height.	Discharge.
		Feet.	*Sec.-ft.*
Nov. 17	C. O. Brown	2.10	1,120
Sept. 6	Brown and Hoyt	.75	344

Daily discharge, in second-feet, of Priest River at outlet of Priest Lake, near Coolin, Idaho, for the year ending Sept. 30, 1915.

Day.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.
1	486	735	980	572	428	446	780	2,400	2,120	1,160	780	408
2	466	790	980	572	423	450	845	2,400	2,070	1,160	780	390
3	486	850	945	567	423	482	910	2.400	2,020	1,120	748	390
4	486	910	945	567	418	520	1,020	2,400	1,970	1,080	734	390
5	466	975	945	556	418	525	1,080	2,340	1,920	1,080	722	373
6	466	1,040	945	545	418	520	1,160	2,340	1,870	1,050	709	356
7	486	1,180	945	540	414	515	1,240	2,280	1,870	1,020	697	340
8	466	1,110	910	535	414	510	1,280	2,280	1,820	1,020	691	340
9	466	1,180	878	535	436	510	1,320	2,280	1,770	980	685	356
10	486	1,180	845	525	441	500	1,360	2,280	1,720	980	673	340
11	486	1,180	845	515	441	500	1,400	2,280	1,720	980	655	340
12	486	1,180	812	510	432	500	1,450	2,280	1,630	945	638	324
13	486	1,180	812	510	423	495	1,540	2,230	1,630	910	628	324
14	486	1,180	780	500	423	495	1,680	2,280	1,580	910	622	324
15	486	1,180	774	500	414	510	1,720	2,280	1,580	910	616	324
16	486	1,180	754	490	414	525	1,820	2,280	1,540	910	606	324
17	486	1,180	734	482	405	535	1,920	2,230	1,500	945	594	308
18	530	1,110	728	477	410	482	2,020	2,230	1,500	910	578	308
19	592	1,040	715	472	405	500	2,120	2,230	1,450	945	567	308
20	653	1,040	691	482	405	505	2,230	2,180	1,400	910	567	308
21	653	1,040	650	477	410	525	2,340	2,180	1,400	910	545	308
22	680	1,040	638	472	414	540	2,340	2,120	1,360	878	535	308
23	680	1,040	628	464	418	562	2,400	2,120	1,320	878	525	308
24	708	1,010	616	454	423	611	2,400	2,120	1,280	845	515	308
25	708	980	616	450	428	638	2,400	2,120	1,240	845	495	308
26	708	1,020	611	446	432	644	2,400	2,120	1,240	845	446	308
27	708	1,020	600	441	436	661	2,400	2,120	1,240	812	446	308
28	708	1,020	600	436	441	679	2,400	2,120	1,240	812	446	308
29	735	1,020	589	428	....	703	2,340	2,180	1,200	812	427	308
30	680	980	589	428	....	760	2,400	2,180	1,200	780	408	308
31	680	....	584	428	....	754	....	2,120	....	780	408	....

Note.—Discharge ascertained as follows: Oct. 1 to Nov. 23, and Aug. 26 to Sept. 30, from gage-height record on gage at Coolin and well-defined rating curve, based on well-defined rating curve for gage below outlet and gage-relation curve; Nov. 26 to Aug. 25, from record from water-stage recorder below outlet and well-defined rating curve. Oct. 13–16, 19, 27, Nov. 13–16, 24, gage not read; discharge interpolated. Feb. 21 to Mar. 2, intake to water-stage recorder clogged; mean gage height Mar. 2, assumed 1.00 foot, same as morning of Mar. 3 (discharge, 450 second-feet); discharge Feb. 21 to Mar. 1, interpolated. Aug. 26 to Sept. 6, recorder stopped. Sept. 7–30, stage below intake.

Monthly discharge of Priest River at outlet of Priest Lake near Coolin, Idaho, for the year ending Sept. 30, 1915.

[Drainage area, 572 square miles.]

Month.	Discharge in second-feet.				Run-off.		Accuracy.
	Maximum.	Minimum.	Mean.	Per square mile.	Depth in inches on drainage area.	Total in acre-feet.	
October	735	466	567	0.991	1.14	34,900	B.
November	1,180	735	1,050	1.84	2.05	62,500	B.
December	980	584	764	1.34	1.54	47,000	A.
January	572	428	496	.867	1.00	30,500	A.
February	441	405	422	.738	.77	23,400	B.
March	760	446	552	.965	1.12	33,900	A.
April	2,400	780	1,760	3.08	3.44	105,000	A.
May	2,400	2,120	2,240	3.92	4.52	138,000	A.
June	2,120	1,200	1,580	2.76	3.08	94,000	A.
July	1,160	780	939	1.64	1.89	57,700	A.
August	780	408	596	1.04	1.20	36,600	A.
September	408	308	332	.580	.65	19,800	B.
The year	2,400	308	943	1.65	22.40	683,000	

SULLIVAN LAKE NEAR METALINE FALLS, WASH.

Location.—Approximately in sec. 31, T. 39 N., R. 44 E. (unsurveyed), near the forest ranger station, at north end of Sullivan Lake, about 4½ miles east of Metaline Falls, in Pend Oreille County.

Drainage area.—Not measured.

Records available.—May 16, 1912, to September 30, 1915.

Gage.—Since May 9, 1913, a float gage on dam at outlet of lake; read once daily to half-tenths by A. J. McDougall. Prior to May 9, 1913, a vertical staff at same site.

Extremes of stage.—Maximum stage recorded during year, 25.5 feet May 28 to June 2; minimum stage recorded, 16.0 feet April 2.

1912–1915: Maximum stage recorded, 26.55 feet at 8.30 a. m. May 16, 1914. minimum stage recorded, 11.2 feet April 13, 1913.

Regulation.—Most of the surplus flow of Sullivan Creek is diverted into the lake; Sufficient water is stored in the lake to afford a continuous flow of about 60 second-feet in the flume of the Lehigh Portland Cement Co. Zero of gage at elevation of gate sills; crest of log chute is 22 feet and crest of spillway 25 feet above gate sills.

Cooperation.—Gage-height record furnished by Lehigh Portland Cement Co.

Daily gage height, in feet, of Sullivan Lake near Metaline Falls, Wash., for the year ending Sept. 30, 1915.

Day.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.
1	21.35	21.05	21.95	20.2	18.4	17.1	16.1	22.2	25.5	25.1	24.9	23.45
2	21.3	21.15	21.95	20.2	18.35	17.1	16.0	22.4	25.5	25.1	24.85	23.4
3	21.2	21.25	21.95	20.1	18.3	17.05	16.3	22.65	25.45	25.1	24.8	23.35
4	21.2	21.35	21.95	20.0	18.3	17.0	16.35	22.95	25.4	25.1	24.8	23.25
5	21.2	21.4	21.9	20.0	18.2	16.9	16.45	23.2	25.4	25.1	24.8	22.95
6	21.15	21.45	21.85	19.95	18.1	16.9	16.65	23.3	25.4	25.1	24.8	22.85
7	21.1	21.5	21.8	19.9	18.05	16.9	16.8	23.45	25.35	25.05	24.75	22.75
8	21.05	21.6	21.75	19.8	18.0	16.9	16.85	23.65	25.3	25.05	24.75	22.6
9	20.95	21.7	21.7	19.8	17.95	16.9	16.95	23.7	25.3	25.05	24.7	....
10	20.9	21.85	21.65	19.85	17.9	16.85	16.8	23.9	25.3	25.0	24.7	....
11	20.95	21.95	21.6	19.8	17.8	16.7	16.85	24.1	25.3	25.0	24.65	....
12	20.95	22.05	21.55	19.7	17.8	16.6	16.9	24.25	25.3	25.0	24.55	22.2
13	20.8	22.15	21.4	19.7	17.8	16.55	17.4	24.45	25.25	25.0	24.5	22.1
14	20.8	22.35	21.35	19.6	17.8	16.5	17.85	24.65	25.2	24.95	24.5	22.0
15	20.75	22.45	21.25	19.5	17.75	16.5	18.1	24.9	25.15	24.95	24.5	21.95
16	20.7	22.5	21.2	19.45	17.7	16.5	18.6	25.0	25.1	24.9	24.5	21.8
17	20.7	22.45	21.15	19.4	17.7	16.45	18.8	25.1	25.1	24.9	24.45	21.65
18	20.75	22.45	21.1	19.3	17.65	16.45	19.15	25.2	25.0	24.95	24.35	21.55
19	20.8	22.45	20.95	19.25	17.6	16.45	19.6	25.15	25.1	24.95	24.35	21.5
20	20.85	22.4	20.85	19.2	17.55	16.4	19.8	25.15	25.1	25.0	24.3	21.45
21	20.85	22.35	20.8	19.15	17.5	16.4	20.0	25.15	25.1	25.0	24.3	21.35
22	20.8	22.35	20.75	19.1	17.4	16.35	20.4	25.15	25.1	25.0	24.15	21.25
23	20.85	22.3	20.65	19.05	17.3	16.3	20.55	25.2	25.1	25.0	24.0	21.2
24	20.9	22.3	20.6	19.0	17.25	16.3	20.65	25.25	25.1	24.9	23.95	21.1
25	20.85	22.3	....	18.95	17.2	16.25	20.9	25.4	25.1	24.9	23.9	21.05
26	20.85	22.3	20.5	18.85	17.15	16.25	21.1	25.4	25.1	24.9	23.9	21.0
27	20.9	22.25	20.5	18.7	17.1	16.2	21.2	25.45	25.1	24.9	23.85	20.9
28	20.95	22.2	20.45	18.6	17.1	16.2	21.4	25.5	25.05	25.0	23.8	20.8
29	21.0	22.15	20.45	18.5	....	16.2	21.6	25.5	25.05	25.0	23.7	20.65
30	21.0	22.1	20.35	18.45	....	16.2	21.95	25.5	25.0	25.0	23.6	20.55
31	21.05	....	20.25	18.4	....	16.2	....	25.5	....	25.0	23.5	....

NOTE.—Mean height for year, 21.48 feet.

SULLIVAN CREEK NEAR METALINE FALLS, WASH.

LOCATION.—In sec. 30, T. 39 N., R. 44 E. Willamette meridian, one-eighth mile below Outlet Creek, half a mile below Sullivan Lake, and about 4 miles east of Metalline Falls, Pend Oreille County.

DRAINAGE AREA.—Not measured.

RECORDS AVAILABLE.—May 16, 1912, to September 30, 1915.

GAGE.—Vertical staff on right bank one-eighth mile below mouth of Outlet Creek; read once daily to half-tenths by A. J. McDougall.

DISCHARGE MEASUREMENTS.—Made by wading at all stages.

CHANNEL AND CONTROL.—Stream bed of cobble stones and large gravel; likely to shift. Banks high and not subject to overflow. Channel for some distance below gage acts as control. Gradient steep.

EXTREMES OF DISCHARGE.—Maximum stage recorded during year, 2.7 feet at 8 a. m. April 24 (discharge, 635 second-feet); minimum stage recorded, 1.3 feet January 27–31 (discharge, 64 second-feet).

1912–1915: Maximum stage recorded, 4.2 feet June 2, 1913 (discharge, 1,650 second-feet); minimum stage recorded, 1.10 feet February 1, 1913 (discharge, 53 second-feet.)

WATER FLOW.—Stage-discharge relation not affected by ice.

DIVERSIONS.—Water diverted from Sullivan Creek, for storage in Sullivan Lake, about 1 mile above station but entire run-off of drainage area passes gage.

REGULATION.—Storage in Sullivan Lake is utilized by Lehigh Portland Cement Co. to increase the flow during low water.

ACCURACY.—Results good October to May and excellent June to September.

COOPERATION—Maintained in cooperation with United States Forest Service and Lehigh Portrand Cement Co.

Discharge measurements of Sullivan Creek near Metaline Falls, Wash., during the year ending Sept. 30, 1915.

[Made by C. O. Brown.]

Date.	Gage height.	Discharge.
	Feet.	*Sec.-ft.*
Dec. 2	1.60	127
June 20	1.85	202

Daily discharge, in second-feet, of Sullivan Creek near Metaline Falls, Wash., for the year ending Sept. 30, 1915.

Day.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.
1	120	148	133	106	83	94	164	381	508	145	118	118
2	106	164	120	106	83	83	240	591	508	132	118	118
3	120	164	133	106	83	83	260	406	481	132	118	118
4	106	164	148	106	83	83	280	336	456	132	106	118
5	106	164	148	83	83	94	260	336	456	118	106	118
6	106	182	120	83	74	94	240	336	431	118	106	118
7	106	164	106	94	74	94	200	358	431	118	106	118
8	106	164	94	94	83	83	220	381	358	118	95	118
9	106	148	94	94	83	83	220	381	291	118	95	118
10	106	148	83	94	83	94	200	381	291	118	95	118
11	120	148	83	94	94	94	240	336	251	118	95	118
12	120	164	83	94	106	83	220	336	251	118	95	118
13	120	164	83	120	94	83	260	336	251	118	95	118
14	106	164	83	120	94	94	325	406	251	106	95	118
15	106	164	83	106	83	106	370	406	251	118	95	118
16	94	148	83	120	83	106	370	381	231	132	95	118
17	106	164	83	106	83	120	420	406	231	132	95	106
18	133	164	83	83	106	120	445	406	231	118	95	106
19	164	164	83	83	120	106	470	431	211	132	95	106
20	148	148	74	83	106	106	498	431	194	132	95	106
21	133	148	74	83	106	120	498	456	176	118	95	106
22	133	148	74	74	94	133	525	456	176	118	95	95
23	120	148	74	74	83	133	608	481	160	118	95	95
24	120	148	74	74	94	133	635	481	160	106	95	95
25	120	164	74	74	94	120	508	481	160	106	95	95
26	120	148	74	74	94	120	481	536	160	118	95	95
27	106	164	74	64	83	106	336	564	160	132	95	95
28	106	148	74	64	94	120	291	564	145	132	85	95
29	106	148	74	64	......	133	291	591	145	132	85	95
30	106	148	94	64	......	148	291	536	145	132	95	106
31	120	......	120	64	......	164	......	508	......	118	106	......

NOTE.—Discharge ascertained as follows: Oct. 1 to Apr. 24, from rating curve fairly well defined between 100 and 600 second-feet; Apr. 25 to Sept. 30, from rating curve well defined between 75 and 250 second-feet and fairly well defined above 250 second-feet. Sept. 9–11, gage not read, discharge interpolated.

Monthly discharge of Sullivan Creek near Metaline Falls, Wash., for the year ending Sept. 30, 1915.

Month.	Discharge in second-feet.			Run-off (total in acre-feet).	Accuracy.
	Maximum.	Minimum.	Mean.		
October	164	94	116	7,130	B.
November	182	148	157	9,340	B.
December	148	74	92.9	5,710	B.
January	120	64	88.6	5,450	B.
February	120	74	90.1	5,000	B.
March	164	83	108	6,640	B.
April	635	164	346	20,600	B.
May	591	336	433	26,600	B.
June	508	145	272	16,200	A.
July	145	106	123	7,560	A.
August	118	85	98.4	6,050	A.
September	118	95	109	6,490	A.
The year	635	64	169	123,000	

KETTLE RIVER AT BOYDS, WASH.

Location.—In sec. 9, T. 37 N., R. 37 E. Willamette meridian, opposite Great Northern Railway station at Boyds, 1¼ miles above Sherwood Creek [1] and 4 miles above the mouth, in Ferry County.

Drainage area.—4,060 square miles, measured on British Columbia Railway Belt map and United States Geological Survey map of State of Washington.

Records available.—September 10, 1913, to October 31, 1915.

Gage.—Since October 18, 1913, inclined and vertical staff on right bank, 800 feet east of Great Northern Railway depot. From September 13 to October 17, 1913, a vertical staff gage anchored to upstream side of right abutment of Great Northern Railway bridge, 1 mile below present gage and at different datum. Gage read once a day to hundredths by Fred Wercker from October 1, 1914, to August 7, 1915, and by P. C. Pedrsen from August 8 to October 31, 1915.

Discharge measurements.—Made from a cable 600 feet above gage or by wading.

Channel and control.—One channel at all stages; banks high and not subject to overflow; control at low stages formed by gravel and cobblestone riffle about 200 feet below gage; control at medium and high stages formed by section of stream bed extending for some distance below gage; may shift during floods. Stage of zero flow, gage height −1.3 ±0.1 foot, as determined October 8, 1915.

Extremes of discharge.—Maximum stage recorded October 1, 1914, to October 31, 1915, 8.7 feet at 11 a. m. May 21 (discharge, 14,300 second-feet); minimum stage recorded, 0.58 foot at 10 a. m. March 10 (discharge, 411 second-feet).

1913–1915: Maximum stage recorded, 10.0 feet at 7 a. m. May 17, 1914 (discharge, 18,000 second-feet); minimum stage recorded, 0.28 foot at 7 a. m. August 30, 1911 (discharge, 288 second-feet).

Winter flow.—Stage-discharge relation seriously affected by ice; flow estimated from observer's notes and records of percipitation and temperature.

Diversions.—None.

Regulation.—A small amount of storage is utilized for meeting diurnal fluctuation of load at the power plant at Cascade, British Columbia.

Accuracy.—Very little diurnal fluctuation. Results excellent except for period in which stage-discharge relation was affected by ice.

Discharge measurements of Kettle River at Boyds, Wash., during the year ending Sept. 30, 1915.

[Made by C. O. Brown.]

Date.	Gage height.	Discharge.
	Feet.	*Sec.-ft*
Aug. 5	3.26	2,930
6	3.14	2,810
Oct. 8	.71	530

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[1] For discharge of Sherwood Creek see page 252.

Daily discharge, in second-feet, of Kettle River at Boyds, Wash., from Oct. 1, 1914, to Oct. 31, 1915.

Day.	Oct.	Nov.	Dec.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.
1	970	1,200	1,120	760	1,950	9,750	12,800	4,750	3,450	840	552
2	935	1,370	1,040	700	2,170	8,540	12,000	4,240	3,450	840	552
3	900	1,650	1,040	640	2,910	8,780	11,200	4,080	3,150	805	552
4	865	1,750	1,040	575	4,930	8,540	10,200	3,760	3,010	805	552
5	830	1,850	1,040	520	5,470	8,310	9,460	3,450	3,010	770	552
6	795	1,950	1,040	495	5,290	7,860	9,220	4,080	2,740	770	552
7	760	1,950	970	470	5,290	7,860	8,980	3,920	2,610	738	552
8	728	1,950	935	470	5,470	8,780	8,740	4,080	2,420	738	552
9	728	1,750	970	470	5,650	10,000	7,830	4,080	2,240	705	580
10	695	1,650	865	411	5,110	10,000	6,980	4,080	1,890	705	552
11	677	1,650	970	445	5,110	11,300	6,580	5,270	1,890	705	552
12	671	1,560	900	470	5,110	10,000	6,190	4,580	1,780	705	552
13	671	1,560	830	470	5,830	8,310	5,810	4,080	1,680	705	552
14	671	1,560	665	470	7,000	7,860	5,810	4,750	1,580	705	552
15	671	1,460	650	495	7,210	9,750	5,810	4,580	1,490	705	552
16	728	1,370	640	520	7,000	10,500	5,450	4,580	1,490	705	552
17	795	1,200	590	520	7,210	9,260	5,270	5,450	1,400	705	552
18	795	1,200	640	548	8,310	8,780	5,090	6,190	1,360	705	580
19	970	1,200	690	575	9,500	10,200	4,750	5,810	1,310	738	610
20	1,560	1,280	730	728	10,200	13,700	5,090	5,450	1,220	705	610
21	1,560	1,200	760	970	11,000	14,300	4,920	5,090	1,310	672	610
22	1,560	1,200	730	970	9,500	14,000	4,580	4,750	1,220	672	640
23	1,460	1,200	760	1,120	8,080	14,000	4,410	4,080	1,310	640	640
24	1,370	1,120	800	1,460	7,210	13,400	4,080	3,760	1,220	610	640
25	1,280	1,120	750	1,750	6,600	12,800	3,920	3,300	1,060	640	640
26	1,200	1,120	830	1,850	6,400	13,400	3,760	3,150	1,060	610	672
27	1,200	1,120	800	1,750	6,210	12,300	3,920	3,760	985	610	1,060
28	1,200	1,120	860	1,650	6,400	11,700	4,080	3,450	985	610	1,060
29	1,120	1,120	830	1,650	6,210	11,500	5,450	3,450	948	580	840
30	1,120	1,120	860	1,650	7,860	14,200	5,450	3,760	910	580	875
31	1,120	....	900	1,650	....	13,100	....	3,450	910	....	840

NOTE.—Discharge ascertained from a well-defined rating curve. Stage-discharge relation seriously affected by ice Dec. 15 to Mar. 3. Discharge estimated from observer's notes and records of precipitation and temperature Dec. 15-31 and Mar. 1-3. Discharge for January and February not considered sufficiently reliable for publication, but monthly means are given in the following table:

Monthly discharge of Kettle River at Boyds, Wash., for the year ending Sept. 30, 1915.

Month.	Discharge in second-feet.			Run-off (total in acre-feet).	Accuracy.
	Maximum.	Minimum.	Mean.		
October	1,560	671	987	60,700	A.
November	1,950	1,120	1,420	84,500	A.
December	1,120	590	847	52,100	B.
January	....	....	800	49,200	D.
February	....	....	930	51,600	D.
March	1,850	411	878	54,000	A.
April	11,000	1,950	6,410	381,000	A.
May	14,300	7,860	10,700	658,000	A.
June	12,800	3,760	6,590	392,000	A.
July	6,190	3,150	4,300	264,000	A.
August	3,450	910	1,780	109,000	A.
September	840	580	701	41,700	A.
The year	14,300	411	3,040	2,200,000	

NOTE.—Mean discharge for October, 1915, 636 second-feet; run-off, 39,100 acre-feet.

HALL CREEK NEAR INCHELIUM, WASH.

Location.—In the NW. ¼ sec. 6, T. 32 N., R. 37 E., half a mile above highway bridge, three-fourths mile above mouth, and 1¼ miles northwest of Inchelium, in Ferry County. From May 16, 1913, to July 31, 1915, in the NE. ¼ sec. 2, T. 32 N., R. 36 E., at Wire's bridge, a quarter of a mile from Gwen mine, 3 miles above mouth, and 3 miles west of Inchelium.

Drainage area.—163 square miles at present site and 160 square miles at upper site (measured on map of Colville Indian Reservation).

Records available.—December 18, 1912, to September 30, 1915.

Gage.—Vertical staff attached to tree on right bank, half a mile above highway bridge; read once daily to hundredths by Walter Johnson. Upper gage was a vertical staff on left abutment of Wire's bridge; read twice daily to hundredths by Mrs. G. E. Fish.

Discharge measurements.—Made from bridge or by wading.

Channel and control.—Stream bed at both sites composed of gravel and boulders; shifting at high stages. Banks at present site heavily wooded and subject to overflow above gage height, 3.0 feet.

Extremes of discharge.—Maximum stage recorded during year, 1.78 feet (at upper gage) May 25 (discharge, 519 second-feet); minimum stage recorded, 0.34 foot September 21–23 (discharge, 20 second-feet).

1912–1915: Maximum stage recorded, 3.10 feet at 6.20 a. m. April 16, 1914 (discharge, 965 second-feet); minimum stage recorded, 0.03 foot at 6.45 p. m. September 5 and 7.30 p. m. September 6, 1914 (discharge, 18 second-feet).

Winter flow.—Stage-discharge relation seriously affected by ice; flow estimated from observer's notes, records of precipitation, and temperature and current-meter measurements.

Diversions.—Water diverted for use in Gwen mine power plant but is returned to creek.

Regulation.—Practically no regulation.

Accuracy.—Results good, practically no diurnal fluctuation.

Discharge measurements of Hall Creek at Inchelium, Wash., for the period Aug. 25, 1914, to Sept. 30, 1915.

Date.	Made by—	Gage height.		Discharge.	Date.	Made by—	Gage height.		Discharge.
		Upper gage.	Lower gage.				Upper gage.	Lower gage.	
		Feet.	*Feet.*	*Sec.-ft.*			*Feet.*	*Feet.*	*Sec.-ft.*
Aug. 25	C. O. Brown.....	[a] 0.05	0.43	20	Mar. 31	C. O. Brown.....	1.09	1.35	184
25	.....do...........	[a] .05	.43	20	Apr. 1	.....do...........	1.12	1.38	188
Dec. 8	.....do...........	.17	.49	27	Sept. 16	G. L. Parker....	.12	.38	21

[a] Incorrectly published as 0.08 foot in Water-Supply Paper 392.

Daily discharge, in second-feet, of Hall Creek near Inchelium, Wash., from Apr. 1, 1914, to Sept. 30, 1915.

Day.	Apr.	May.	June.	July.	Aug.	Sept.	Day.	Apr.	May.	June.	July.	Aug.	Sept.
1914.							1914.						
1	157	426	160	64	27	20	16	920	407	100	43	21	32
2	152	434	163	67	26	20	17	785	355	95	43	21	36
3	152	548	151	59	26	21	18	653	355	93	39	21	40
4	189	576	146	64	27	21	19	610	330	86	40	21	39
5	236	548	163	68	26	18	20	653	306	84	35	21	32
6	327	490	151	67	26	18	21	610	292	82	35	21	31
7	445	434	160	57	26	22	22	567	261	86	35	20	28
8	525	434	166	52	25	25	23	525	274	78	34	20	25
9	525	407	136	52	24	24	24	504	261	87	34	20	24
10	567	381	126	46	23	24	25	492	237	98	32	20	26
11	567	381	126	45	23	25	26	480	221	86	31	20	26
12	610	381	124	45	22	23	27	480	229	78	31	20	27
13	653	381	119	45	22	22	28	466	233	78	31	20	28
14	653	355	113	51	21	24	29	436	199	71	29	20	26
15	830	355	104	47	21	27	30	428	185	68	28	20	28
							31	......	163	......	28	20	......

Day.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.
1914–5.											
1	......	39	28	28	34	199	257	330	76	......	23
2	......	43	28	28	34	253	221	306	74	......	22
3	......	41	28	29	35	355	203	274	71	......	22
4	......	37	28	28	36	381	192	270	75	......	22
5	......	35	28	28	37	381	185	241	66	......	22
6	......	39	28	28	37	355	170	225	69	......	21
7	......	34	28	26	37	330	166	210	71	......	21
8	......	28	29	26	40	330	138	192	68	......	21
9	......	27	31	28	43	306	133	179	74	......	21
10	......	......	32	28	40	306	128	179	68	......	21
11	......	......	34	28	40	284	133	170	63	......	21
12	......	......	32	28	40	284	133	170	60	......	20
13	......	......	31	28	40	330	126	170	57	......	20
14	......	......	31	28	44	381	166	166	60	......	20
15	......	......	31	29	57	355	192	149	63	......	21
16	......	......	31	31	76	330	170	146	58	......	20
17	......	......	......	31	81	302	166	136	53	......	20
18	......	......	......	31	82	292	229	124	58	......	20
19	35	......	......	29	91	330	330	136	62	......	20
20	41	......	......	28	98	330	407	133	55	......	20
21	41	......	......	28	106	306	462	121	51	......	19
22	39	......	......	28	136	257	490	102	48	26	19
23	37	......	......	28	126	257	462	102	45	26	19
24	35	......	......	29	196	245	490	96	42	26	20
25	35	......	......	31	173	225	519	93	42	25	20
26	35	......	......	31	136	207	462	93	39	24	20
27	36	......	......	31	113	196	407	93	44	24	20
28	41	......	......	31	108	189	434	89	45	24	20
29	41	......	......	......	108	189	434	84	42	24	20
30	40	......	......	......	144	274	381	80	45	24	20
31	......	28	......	......	146	......	355	......	45	24	......

NOTE.—Discharge ascertained as follows: Apr. 1-23, 1914, from rating curve well defined between 30 and 500 second-feet; Apr. 24 to May 1, 1914, by method for shifting control; May 2, 1914, to July 31, 1915, from a fairly well-defined rating curve (curves applicable to readings on upper gage); Aug. 22 to Sept. 30, 1915, from a fairly well-defined rating curve applicable to readings on lower gage. Discharge for periods in which gage was not read estimated by hydrographic comparison with records of Stranger Creek at Inchelium, Oct. 1-31, 1914, 36 second-feet; Nov. 1-18, 1914, 39 second-feet; Aug. 1-21, 1915, 32 second-feet. Discharge estimated, because of ice, from observer's notes and records of precipitation and temperature, Dec. 10-30, 1914, 24 second-feet; Jan. 17-24, 1915, 30 second-feet; Jan. 25-31, 1915, 27 second-feet.

Monthly discharge of Hall Creek, near Inchelium, Wash., for the period Apr. 1, 1914, to Sept. 30, 1915.

Month.	Discharge in second-feet.			Run-off (total in acre-feet).	Accuracy.
	Maximum.	Minimum.	Mean.		
1914.					
April	920	152	507	30,200	B.
May	576	163	350	21,500	B.
June	166	68	113	6,720	B.
July	68	28	44.4	2,730	B.
August	27	20	22.3	1,370	B.
September	40	18	26.1	1,550	B.
The period				64,100	
1914–15.					
October			36.0	2,210	D.
November			38.6	2,300	D.
December	43		27.6	1,700	C.
January	34		29.3	1,800	C.
February	31	26	28.8	1,600	B.
March	196	34	81.1	4,990	B.
April	381	189	292	17,400	B.
May	519	126	282	17,300	B.
June	330	80	162	9,640	B.
July	76	39	57.7	3,550	B.
August		24	29.6	1,820	C.
September	23	19	20.5	1,220	C.
The year	519		90.5	65,500	

STRANGER CREEK AT INCHELIUM, WASH.

Location.—In sec. 5, T. 32 N., R. 37 E. Willamette meridian, below all tributaries, about half a mile above mouth and half a mile south of Inchelium, in Ferry County.

Drainage area.—74 square miles (measured on Colville Indian Reservation map, edition of 1913).

Records available.—March 18, 1914, to September 30, 1915.

Gage.—Vertical staff on right bank; read once a day to quarter-tenths, by Walter Johnson.

Discharge measurements.—Made from wagon bridge 50 feet below gage or by wading.

Channel and control.—Bed of stream composed of sand and gravel; overhanging brush partially obstructs flow at high stages. One channel at all stages. Sand and gravel riffle control 15 feet below gage shifts readily. Stage of zero flow, gage height 0.4 feet, as determined August 26, 1914.

Extremes of discharge.—Maximum stage recorded, 2.15 feet at 1.30 p. m. April 12 (discharge, 86 second-feet); minimum discharge estimated 3.2 second-feet during ice season.

1914–1915: Maximum stage recorded, 3.80 feet April 18, 1914 (discharge, 209 second-feet); minimum discharge in 1915.

Winter flow.—Stage-discharge relation seriously affected by ice; flow estimated from observer's notes and records of precipitation and temperature.

Diversions.—Several small ditches divert water for irrigation above gage.

Regulation.—None.

Accuracy.—Results good except during ice season and extremely low water, when rating curve is not well defined. Some diurnal fluctuation March to June.

Discharge measurements of Stranger Creek at Inchelium, Wash., during the year ending Sept. 30, 1915.

Date.	Made by—	Gage height.	Discharge.	Date.	Made by—	Gage height.	Discharge.
		Feet.	*Sec.-ft.*			*Feet.*	*Sec.-ft.*
Dec. 8	C. O. Brown	0.80	5.22	Apr. 2	C. O. Brown	1.32	36.3
8	.....do	.80	5.18	Sept. 16	G. L. Parker	.41	4.71
Mar. 30	.....do	1.18	27.6	16	.....do	.40	4.72
Apr. 2	.....do	1.34	40.0				

Daily discharge, in second-feet, of Stranger Creek at Inchelium, Wash., for the year ending Sept. 30, 1915.

Day.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.
1	5.5	11	9	......	4.6	11	32	40	40	18	11	6.2
2	7.4	11	9.	......	5	10	35	38	40	18	11	4.9
3	7.4	9.9	9.3	......	5	10	38	38	40	18	11	4.9
4	7.7	9.6	9.3	......	5	10	42	38	40	18	11	4.9
5	7.4	9	7.7	......	4.6	10	50	38	38	17	11	4.9
6	6.9	9	7.4	6.9	3.9	9	56	32	35	17	10	4.9
7	6.9	9	7.4	6.6	4.6	10	62	30	35	16	9.8	4.9
8	6.6	8.3	5	6.6	5	10	68	29	35	16	9.8	4.9
9	6.6	8.3	4.8	6.6	5.5	11	74	29	35	16	9.8	4.9
10	6.6	8.3	4.6	6.6	5.8	11	80	28	35	16	9.2	4.9
11	7.2	8.3	......	6.9	6.4	11	80	27	35	16	9	4.9
12	7.2	8	......	6.9	6.9	11	86	26	32	16	9	4.7
13	6.9	12	......	6.4	6.4	14	80	26	30	16	9	4.7
14	7.2	11	......	6.4	6.4	15	80	28	29	16	8.7	4.7
15	6.9	9.3	......	6.4	6.4	16	77	28	27	15	8.7	5.1
16	7.2	7.2	......	6.1	6.4	16	74	29	27	15	8.5	4.7
17	7.7	7.7	......	6.1	6.4	18	74	30	27	15	8.2	4.7
18	7.7	8	......	6.1	6.4	18	71	32	27	15	8	4.7
19	14	9	......	5.5	6.4	19	65	32	27	14	7.5	4.7
20	14	9.3	......	5.5	6.4	18	62	35	25	14	7.3	4.7
21	10	10	......	5.5	6.6	18	59	35	21	14	7.3	4.7
22	9.3	9.3	......	5.5	6.6	19	53	35	20	14	7	4.7
23	9	9.3	......	5.3	6.9	19	50	35	19	13	7	4.7
24	8.7	9	......	5	6.9	20	48	38	19	12	6.8	5.1
25	7.7	9	......	......	9.3	22	42	38	18	12	6.6	5.1
26	8.7	9	......	......	9.3	23	42	40	18	12	6.6	5.1
27	10	8.7	......	......	7.7	24	40	40	18	12	6.4	5.1
28	10	9.3	......	......	9.3	24	40	42	18	12	6.4	5.1
29	11	9.3	......	......	......	25	40	40	18	12	6.4	5.1
30	11	9.3	......	......	......	29	42	40	18	11	6.4	5.1
31	11	......	......	4.6	......	30	......	40	......	11	6.4	......

Note.—Discharge ascertained as follows: Oct. 1 to Feb. 28, from rating curve fairly well defined between 4 and 120 second-feet. Mar. 1-29, by methods devised for shifting control. Mar. 30 to Sept. 30, from rating curve fairly well defined between 5 and 50 second-feet. Stage-discharge relation affected by ice Dec. 11 to Jan. 5 and Jan. 25-30; discharge estimated from observer's notes and records of precipitation and temperature: Dec. 11-15, 4 second-feet; Dec. 16-20, 3 second-feet; Dec. 21-25 ,4 second-feet; Dec. 26-31, 5 second-feet; Jan. 1-5 ,6 second-feet; and Jan. 25-30 ,5 second-feet.

Monthly discharge of Stranger Creek at Inchelium, Wash., for the year ending Sept. 30, 1915.

Month.	Discharge in second-feet.			Run-off (total in acre-feet).	Accuracy.
	Maximum.	Minimum.	Mean.		
October	14	5.5	8.43	518	B.
November	12	7.2	9.18	546	B.
December	9.3	....	5.11	314	C.
January	6.9	....	5.85	360	C.
February	9.3	3.9	6.29	349	C.
March	30	9	16.5	1,010	D.
April	86	32	58.1	3,460	C.
May	42	26	34.1	2,100	B.
June	40	18	28.2	1,680	B.
July	18	11	14.7	904	B.
August	11	6.4	8.41	517	B.
September	6.2	4.7	4.92	293	B.
The year	86	....	16.6	12,100	

COEUR D'ALENE LAKE AT COEUR D'ALENE, IDAHO.

Location.—In the SW. ¼ SW. ¼ sec. 13, T. 50 N., R. 4 W., at Johnson's wharf, 800 feet southeast of railroad station at Coeur d'Alene, in Kootenai County.

Drainage area.—Not measured.

Records available.—February 11, 1905, to September 30, 1915; April 25, 1903, to February 10, 1905, at gage of the St. Joe Boom Co., at mouth of St. Joe River.

Gage.—Vertical staff on pile at wharf; read to hundredths daily by Henry Kloppenburg. Add 2,100 feet to reduce readings to mean sea level.

Extremes of stage.—Maximum stage recorded during year, 27.12 feet May 22; minimum stage recorded, 21.90 feet January 31.

1903–1915: Maximum stage recorded, 34.45 feet May 30–31, 1913; minimum stage recorded, 19.9 feet on October 10–12, 1904, September 24–25, 1905, October 14 to November 3, 1906.

Diversions.—None.

Regulation.—Considerable storage is utilized by the Washington Water Power Co. for increasing the summer flow of Spokane River; regulation is effected by tainter gates and a bear-trap dam at Post Falls.

Cooperation.—Gage-height record furnished by the Washington Water Power Co.

Daily gage height, in feet, Coeur d'Alene Lake at Coeur d'Alene, Idaho, for the year ending Sept. 30, 1915.

Day.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.
1	24.33	24.70	25.35	23.20	21.92	23.34	25.60	25.26	26.46	26.48	25.56	24.14
2	24.40	24.78	25.28	23.18	21.93	23.44	25.66	25.28	26.40	26.44	25.52	24.10
3	24.36	24.89	25.21	23.56	21.99	23.52	25.78	25.30	26.28	26.42	25.50	24.02
4	24.38	25.20	25.14	23.14	21.99	23.64	25.94	25.30	26.16	26.42	25.48	24.00
5	24.39	25.40	25.06	23.11	21.98	23.74	26.12	25.20	26.00	26.42	25.42	23.96
6	24.38	25.50	24.98	23.06	21.98	23.84	26.24	25.28	25.90	26.42	25.38	23.88
7	24.37	25.51	24.88	23.03	21.98	23.92	26.32	25.38	25.86	26.40	25.36	23.80
8	24.36	25.50	24.77	22.99	21.98	24.02	26.32	25.48	25.92	26.40	25.30	23.74
9	24.36	25.47	24.64	22.96	21.98	24.12	26.22	25.60	25.96	26.44	25.26	23.70
10	24.36	25.43	24.52	22.89	22.04	24.20	26.18	25.70	25.98	26.46	25.22	23.66
11	24.40	25.42	24.40	22.83	22.06	24.30	26.12	25.90	26.18	26.48	25.18	23.58
12	24.43	25.41	24.27	22.81	22.10	24.40	26.02	26.02	26.26	26.44	25.18	23.56
13	24.44	25.52	24.10	22.74	22.12	24.56	26.02	26.16	26.32	26.42	25.06	23.56
14	24.44	25.76	23.98	22.73	22.13	24.66	26.10	26.30	26.36	26.42	25.02	23.54
15	24.45	25.98	23.87	22.68	22.17	24.86	26.20	26.26	26.38	26.44	24.98	23.50
16	24.45	26.09	23.76	22.59	22.16	25.08	26.30	26.24	26.40	26.46	24.92	23.46
17	24.47	26.13	23.68	22.52	22.18	25.30	26.40	26.26	26.38	26.48	24.88	23.42
18	24.49	26.15	23.60	22.49	22.18	25.42	26.46	26.38	26.36	26.44	24.86	23.38
19	24.54	26.12	23.52	22.47	22.20	25.50	26.50	26.71	26.42	26.40	24.80	23.34
20	25.51	26.09	23.47	22.44	22.30	25.48	26.54	26.47	26.42	26.34	24.74	23.28
21	24.58	26.04	23.41	22.39	22.40	25.46	26.52	27.10	26.42	26.28	24.66	23.22
22	24.59	25.99	23.39	22.36	22.54	25.42	26.46	27.12	26.44	26.22	24.66	23.18
23	24.60	25.92	23.34	22.28	22.70	25.42	26.38	27.10	26.48	26.16	24.62	23.12
24	24.60	25.85	23.31	22.24	22.80	25.50	26.24	27.04	26.54	26.08	24.56	23.10
25	24.61	25.80	23.30	22.19	22.90	25.64	26.08	26.98	26.48	25.98	24.52	23.06
26	24.64	25.65	23.31	22.14	23.00	25.74	25.92	26.88	26.44	25.94	24.48	23.00
27	24.64	25.63	23.33	22.07	23.12	25.70	25.74	26.78	26.44	25.86	24.42	22.98
28	24.63	25.60	23.34	21.99	23.24	25.62	25.58	26.70	26.44	25.78	24.38	22.94
29	24.62	25.49	23.31	21.97	....	25.52	25.42	26.64	26.44	25.74	24.32	22.90
30	24.62	25.42	23.29	21.92	....	25.52	25.32	26.58	26.46	25.68	24.26	22.84
31	24.64	....	23.23	21.90	....	25.56	....	26.52	....	25.60	24.20	....

SPOKANE RIVER AT POST FALLS, IDAHO.

Location.—In sec. 4, T. 50 N., R. 5 W. Boise meridian, a quarter of a mile below power plant of Washington Water Power Co., three-fourths mile below intake of Spokane Valley Land & Water Co.'s canal. and a mile west of Post Falls, in Kootanai County.

Drainage area.—3,890 square miles (as measured on topographic and General Land Office maps).

Records available.—January 1, 1913, to September 30, 1915.

Gage.—Vertical staff in three sections, on left bank, a quarter of a mile below power house, read once daily by power plant attendant. Add 2,000 feet to gage heights to reduce readings to mean sea level.

Discharge measurements.—Made from cable 300 feet below gage.

Channel and control.—River bed at and below gage composed of coarse gravel and boulders; may shift at flood stage. One channel at all stages.

Extremes of discharge.—Maximum stage recorded during year, 72.32 feet at 7.30 a. m. April 21 (discharge, 12,000 second-feet); minimum stage recorded, 66.20 feet at 7.30 a. m. October 25 (discharge, 875 second-feet).

1911–1915: Maximum stage recorded, 77.80 feet at 8 a. m. May 30 and June 1, 1913 (discharge, 31,500 second-feet); minimum stage recorded on October 25, 1914.

Winter flow.—Stage-discharge relation not affected by ice.

Diversions.—Spokane Valley Land & Water Co.'s canal divertsabovegage for irrigation. Maximum diversion, 170 second-feet; minimum, 30 second-feet. Storage in Coeur d'Alene Lake partly regulated by operation of gates in dam at Post Falls.

Regulation.—Varying load on power plant causes fluctuation at gage.

Accuracy.—When discharge is less than 5,000 second-feet, stage is somewhat variable, owing to changing load at power plant, so that the one gage reading recorded daily may not indicate true mean gage height. Results below 5,000 second-feet good; between 5,000 and 20,000 second-feet, excellent.

Cooperation.—Gage-height record furnished by the Washington Water Power Co.

Discharge measurements of Spokane River at Post Falls, Idaho, during the year ending Sept. 30, 1915.

Date.	Made by—	Gage height.	Dis-charge.	Date.	Made by—	Gage height.	Dis-charge.
		Feet.	*Sec.-ft.*			*Feet.*	*Sec.-ft.*
Feb. 18	Brown and Slack	67.88	2,420	Apr. 20	C. O. Brown	72.30	11,900
18	do	67.51	1,930	July 14	do	67.15	1,470
Mar. 7	C. O. Brown	66.75	1,200				

Daily discharge, in second-feet, of Spokane River at Post Falls, Idaho, for the year ending Sept. 30, 1915.

Day.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.
1	1,220	920	4,710	1,560	1,560	1,220	9,840	7,990	9,290	1,880	1,660	1,470
2	1,150	1,150	4,530	1,880	1,470	1,300	10,100	5,490	9,290	1,880	1,470	1,470
3	1,220	1,220	4,530	1,560	1,560	1,300	10,100	5,490	9,290	1,880	1,470	1,560
4	920	1,220	4,350	1,770	1,660	1,470	10,700	6,550	9,020	1,880	1,380	1,560
5	1,220	3,050	4,530	2,770	1,300	1,380	11,000	5,900	8,760	1,770	1,380	1,470
6	1,300	3,350	4,350	1,770	970	1,380	11,000	3,350	7,490	1,880	1,560	1,560
7	1,220	4,350	4,350	1,770	1,080	1,150	11,300	2,910	5,900	1,770	1,660	1,560
8	1,300	4,350	4,170	1,770	1,220	1,300	11,300	1,770	4,530	1,470	1,660	1,470
9	1,220	4,170	4,170	2,240	1,300	1,300	11,600	2,240	3,670	1,470	1,380	1,470
10	1,300	4,170	4,000	1,880	1,220	1,380	11,000	2,240	3,200	1,560	1,560	1,470
11	920	4,000	4,000	2,500	1,380	1,380	11,000	2,240	2,000	1,470	1,560	1,470
12	1,150	4,170	4,000	2,000	1,080	1,380	11,000	2,240	4,000	1,380	1,770	1,380
13	1,300	4,350	4,000	2,240	1,300	1,470	10,700	1,880	4,000	1,380	1,770	1,470
14	1,220	4,350	4,000	1,560	1,080	2,770	11,000	2,120	4,000	1,380	1,470	1,560
15	1,300	5,090	4,000	2,770	1,300	2,910	11,000	6,780	4,170	1,470	1,560	1,560
16	1,300	5,090	2,910	1,660	1,770	5,290	11,300	4,000	4,000	1,560	1,560	1,470
17	1,220	5,090	2,910	1,560	1,220	7,010	11,600	4,000	4,000	1,770	1,470	1,470
18	920	5,090	2,770	1,560	1,470	8,760	11,900	3,830	4,000	2,770	1,560	1,470
19	1,220	5,090	2,770	1,880	1,150	9,560	11,900	5,690	1,880	2,630	1,660	1,380
20	1,220	5,090	2,120	1,880	1,220	9,560	11,900	11,000	3,200	2,630	1,560	1,560
21	1,560	5,090	2,120	1,300	1,220	9,560	11,900	11,000	3,200	2,630	1,470	1,470
22	1,220	5,090	1,770	1,470	1,220	9,560	11,900	11,300	2,000	2,500	1,560	1,470
23	1,380	4,900	2,120	1,880	1,300	9,290	11,600	11,300	1,880	2,500	1,380	1,470
24	1,300	4,900	2,120	1,380	1,300	9,290	11,000	11,300	2,000	2,500	1,660	1,380
25	875	4,900	1,470	1,560	1,300	9,840	10,700	11,000	4,170	2,500	1,560	1,560
26	1,220	4,710	1,300	1,770	1,380	10,100	10,700	11,000	3,050	2,770	1,660	1,560
27	1,220	4,710	1,380	1,880	1,380	10,100	10,100	10,700	2,000	2,370	1,560	1,470
28	1,660	4,710	1,770	1,470	1,220	9,840	9,840	10,700	1,880	2,500	1,560	1,470
29	1,220	4,710	2,000	1,380	....	9,560	8,760	10,400	1,880	2,500	1,560	1,470
30	1,220	4,710	1,880	1,380	....	9,560	8,240	10,400	2,000	2,630	1,560	1,470
31	1,220	....	1,880	1,150	....	9,560	....	10,100	....	2,370	1,560	....

Note.—Discharge ascertained from a rating curve well defined between 1,000 and 20,000 second-feet.

Monthly discharge of Spokane River and Spokane Valley Land & Water Co. canal at Post Falls, Idaho, for the year ending Sept. 30, 1915.

[Discharge in second-feet.]

Month.	River.			Canal (mean).	Total (mean).	Run-off (total in acre-feet).	Accuracy.
	Maximum.	Minimum.	Mean.				
October	1,660	875	1,220	44.8	1,260	77,500	B.
November	5,090	920	4,130	38.1	4,170	248,000	B.
December	4,710	1,300	3,130	35.0	3,160	194,000	B.
January	2,770	1,150	1,750	33.8	1,780	109,000	B.
February	1,770	970	1,310	31.4	1,340	74,400	B.
March	10,100	1,150	5,470	37.9	5,510	339,000	A.
April	11,900	8,240	10,900	56.3	11,000	655,000	A.
May	11,300	1,770	6,670	72.9	6,740	414,000	A.
June	9,290	1,880	4,320	88.0	4,410	262,000	B.
July	2,770	1,380	2,050	88.0	2,140	132,000	B.
August	1,770	1,380	1,560	90.7	1,650	101,000	B.
September	1,560	1,380	1,490	90.4	1,580	94,000	B.
The year	11,900	875	3,670	59.1	3,730	2,700,000	

SPOKANE RIVER AT SPOKANE, WASH.

Location.—In sec. 9, T. 25 N., R. 43 E. Willamette meridian, above the Washington Water Power Co.'s steam plant in Spokane, 2.8 miles above Spokane Falls and about 4 miles above Latah Creek, in Spokane County.

Drainage area.—Not measured.

Records available.—March 22, 1891, to September 30, 1915.

Gage.—From October 16, 1913, to July 30, 1915, a combined inclined and vertical staff gage on right bank, 500 feet above the Washington Water Power Co.'s steam plant; read once daily by power plant attendants; approximate elevation of gage datum, 1.800 feet above sea-level; Gages previously used as follows: July 31 to September 30, 1915, a Stevens water-stage recorder at same site and datum as present gage; March 22, 1891, to October 24, 1896, vertical staff gage near headgates at Washington Water Power Co.'s dam at Spokane Falls, 2.8 miles below the present site, and with zero at crest of dam; October 25, 1896, to July 8, 1903, two wire gages at Oregon Railroad & Navigation Co.'s bridge, 0.9 mile below present site, set at sea level datum; July 9, 1903, to March 30, 1904, a wire gage on Olive Street bridge, 1.1 mile below the present site, set at sea-level datum; March 31, 1904, to March 1, 1907, a vertical staff at the Mission Street bridge, 0.4 mile below the present site; March 2, 1907, to July 23, 1911, combined inclined and vertical staff gage at Martha Street bridge, 1,150 feet above present site; July 24, 1911, to October 15, 1913, several gages at present site and datum. Datum of gage was changed with each relocation but simultaneous readings were obtained either before or after change so that the relation of stage at the different sites was established.

Discharge measurements.—Made from a cable 75 feet upstream from gage.

Channel and control.—One channel at all stages; bed of stream composed of gravel and boulders. Control is stretch of channel, contracted by bridge structures and embankments, between station and crest of Spokane Falls; permanent.

Extremes of discharge.—Maximum stage recorded during year, 74.6 feet at 8 a. m. May 23 (discharge, 11,500 second-feet); minimum stage recorded, 68.6 feet at 8 a. m. October 24, 1914 (discharge, 1,300 second-feet).

1891–1915: Maximum stage recorded, 12.42 feet (Washington Water Power Co.'s gage at Spokane Falls dam); May 31, 1894 (discharge, 35,200 second-feet); minimum stage recorded, 1.3 feet (Martha Street gage) September 28 and 30, 1905 (discharge, 1,240 second-feet).

Winter flow.—Stage discharge relation not affected by ice.

Diversion.—Water is diverted above station for irrigation by the Spokane Valley Land & Water Co.

Regulation.—Flow partly regulated by storage in Coeur d'Alene Lake.

Accuracy.—Results excellent. Little diurnal fluctuation due to changes in load at Post Falls power plant.

Cooperation.—Gage-height record furnished by the Washington Water Power Co.

Discharge measurements of Spokane River at Spokane, Wash., during the year ending Sept. 30, 1915.

Date.	Made by—	Gage height.	Dis-charge.
		Feet.	*Sec.-ft.*
Feb. 17	C. O. Brown	69.38	2,170
Sept. 7	Parker and Richardson	69.10	1,940
14	G. L. Parker	69.12	1,940

Daily discharge, in second-feet, of Spokane River at Spokane, Wash., for the year ending Sept. 30, 1915.

Day.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.
1	1,600	1,500	4,370	2,470	2,140	1,700	9,180	8,300	9,460	2,220	2,220	1,940
2	1,600	1,500	4,370	2,710	2,250	1,700	9,180	5,560	9,460	2,450	2,060	1,840
3	1,600	1,600	4,210	2,590	2,140	1,810	9,400	5,560	9,240	2,330	1,940	1,890
4	1,400	1,600	4,210	2,590	2,360	1,810	9,620	6,490	9,020	2,220	1,940	1,840
5	1,500	2,590	4,210	2,590	2,140	1,810	10,100	5,920	8,810	2,220	1,940	1,890
6	1,600	3,220	4,210	2,590	1,920	1,700	10,500	3,920	7,590	2,220	2,000	1,890
7	1,600	3,780	4,210	2,590	1 920	1.700	10,500	3,360	6,060	2,220	2,000	1,890
8	1,500	3,780	4,060	2,590	2,140	1,700	10,500	2,590	4,990	2,000	2,000	1,890
9	1,600	3,780	4,060	2,470	2,030	1,700	10,500	2,830	4,180	1,890	2,000	1,890
10	1,600	3.780	3,920	2,590	2,140	1,810	10,500	2,710	3,610	2,000	2,000	1,890
11	1,400	3,780	3,920	2,710	2,360	1,810	10,300	2,830	2,690	2,000	2,060	1,890
12	1,500	3,780	3,920	2,710	1,920	1,810	10,100	2,830	4,030	1,890	2,000	1,890
13	1,500	3,920	3,920	2,590	2,030	1,700	10,100	2,590	4,330	1,780	1,940	1,890
14	1,600	4,210	3,920	2,360	2,140	2,590	10,100	2,470	4,180	2,000	1,890	1,890
15	1,600	4,530	3,920	2,960	2,140	2,590	10,300	5,920	4,180	2,000	1,940	1,890
16	1,600	4,690	3,090	2,710	2,140	4,530	10,500	3,920	4,030	1,890	1,890	1,890
17	1,500	4,690	3,090	2,360	1,920	6,300	10,800	3,920	4,180	2,110	1,890	1,890
18	1,400	4,690	3,090	2,250	1,810	7,470	11,000	3,920	4,030	2,810	1,890	1,890
19	1,500	4,860	3,090	2,250	1,920	8,300	11,000	5,380	2,690	2,690	1,890	1,840
20	1,500	4,690	2,590	2,140	1,920	8,520	11,000	10,500	3,470	2,690	1,890	1,940
21	1,700	4,690	2,590	2,360	1,810	8,520	11,000	11,000	3,470	2,690	1,890	1,940
22	1,810	4,690	2,470	2,250	1,700	8,300	11,000	11,000	2,570	2,690	1,890	1,940
23	1,810	4,690	2,590	2,360	1,700	8,520	11,000	11,500	2,690	2,810	1,890	1,940
24	1,600	4,690	2,470	2,250	1,700	8,520	10,500	11,000	2,690	2,690	1,940	1,940
25	1,400	4,530	2,250	2,140	1,700	8,740	10,500	11,300	4,030	2,690	1.890	1,940
26	1,500	4,690	2,140	2,360	1,810	9,180	10,100	11,000	3,470	2,690	1,940	1,940
27	1,500	4,530	2,250	2,250	1,810	9,180	9.620	10,800	2,570	2,450	1,940	2,000
28	1,700	4,530	2,590	2,140	1,810	9,180	9,400	10,600	2,450	2,690	1,890	1,940
29	1,600	4,530	2,710	2,140	....	8,960	8,740	10,600	2,450	2,690	1,890	1,940
30	1,810	4,370	2,830	2,140	....	8,960	8,300	10,600	2,220	2,690	1,940	1,890
31	1,700	....	2,710	2,140	....	8,960	....	10,400	....	2,750	1,940	....

Note.—Discharge ascertained as follows: Oct. 1 to May 25, from rating curve well defined between 2,000 and 35,000 second-feet; May 26 to Sept 30, from rating curve well defined between 1,800 and 30,000 second-feet.

Monthly discharge of Spokane River at Spokane, Wash., for the year ending Sept. 30, 1915.

Month.	Discharge in second-feet.			Run-off (total in acre-feet).	Accuracy.
	Maximum.	Minimum.	Mean.		
October	1,810	1,400	1,580	97,200	A.
November	4,860	1,500	3,900	232,000	A.
December	4,370	2,140	3,350	206,000	A.
January	2,960	2,140	2,430	149,000	A.
February	2,360	1,700	1,980	110,000	A.
March	9,180	1,700	5,160	317,000	A.
April	11,000	8,300	10,200	607,000	A.
May	11,500	2,470	6,820	419,000	A.
June	9,460	2,220	4,630	276,000	A.
July	2,810	1,780	2,360	145,000	A.
August	2,220	1,890	1,950	120,000	A.
September	2,000	1,840	1,910	114,000	A.
The year	11,500	1,400	3,850	2,790,000	

SPOKANE RIVER BELOW LITTLE FALLS, NEAR LONG LAKE, WASH.

Location.—In the NW. ¼ sec. 19, T. 27 N., R. 39 E., just above Chamokane Ferry, 1½ miles below Little Falls power plant of Washington Water Power Co., 4 miles below Chamokane Creek, and about 5 miles below Long Lake, in Lincoln County.

Drainage area.—Not measured.

Records available.—November 5, 1912, to September 30, 1915.

Gage.—Stevens water-stage recorder on left bank 1½ miles below the power plant. Gage datum 1,200 feet above mean sea level.

Discharge measurements.—Made from cable 50 feet below gage.

Channel and control.—Large boulders; practically permanent. Banks high. One channel at all stages. No noticeable riffle control below gage.

Extremes of discharge.—Maximum stage during year, from water-stage recorder, 82.5 feet at 7.30 a. m. May 22 (discharge, 15,300 second-feet). Minimum mean daily discharge, 2,000 second-feet, January 15 (stage below intake to stilling well, elevation, 75.05 feet, for 13 hours during day).

1912–1915: Maximum stage from water-stage recorder, 88.7 feet at 11 a. m. and 7 p. m June 1, 1913 (discharge, 31,900 second-feet); minimum mean daily discharge, 1,910 second-feet September 7, 1914.

Winter flow.—Stage-discharge relation not affected by ice.

Diversions.—Spokane Valley Land & Water Co. diverts for irrigation above the station.

Regulation.—Flow affected considerably by power regulation at Little Falls and Long Lake and slightly by power regulation at Ninemile, Spokane, and Post Falls. Low-water flow is affected by storage regulation in Coeur d'Alene Lake.

Accuracy.—Stage-discharge relation permanent; rating curve well defined; results excellent except during periods when stage fell below intake to stilling well.

Cooperation.—Maintained in cooperation with Washington Water Power Co.

The following discharge measurement was made by Brown and Slack:

February 19, 1915: Gage height, 76.42 feet; discharge, 3,560 second-feet. Mean gage height determined from two readings, subject to error on account of fluctuation in stage during measurement.

Daily discharge, in second-feet, of Spokane River below Little Falls, near Long Lake, Wash., for the year ending Sept. 30, 1915.

Day.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.
1	2,420	2,300	4,660	2,600	2,600	2,920	10,500	9,940	11,700	3,040	3,320	2,450
2	2,450	2,840	4,040	2,550	2,550	2,850	10,800	8,360	11,500	3,020	3,100	2,450
3	2,350	2,340	3,680	2,550	2,740	2,890	11,000	7,170	11,000	3,000	3,000	2,490
4	2,130	2,570	3,760	2,640	3,030	2,860	11,200	7,320	11,000	2,850	2,740	2,510
5	2,490	2,230	3,840	2,640	3,600	2,900	11,500	7,260	10,500	2,830	2,640	2,570
6	2,410	2,720	3,660	2,550	3,340	2,920	12,000	5,950	9,650	2,840	2,710	2,710
7	2,580	2,810	3,380	2,630	2,730	2,780	12,000	5,020	8,380	2,900	2,700	2,630
8	2,480	3,230	2,890	2,580	2,730	2,870	12,200	4,250	7,280	2,800	2,470	2,660
9	2,290	3,540	2,700	2,700	2,740	2,790	12,200	3,960	6,300	2,760	2,780	2,620
10	2,450	3,700	2,940	2,250	2,710	2,880	12,200	3,960	5,600	2,740	2,720	2,390
11	2,200	3,860	3,000	2,240	3,050	2,810	12,000	3,820	4,840	2,690	2,650	2,440
12	2,540	4,200	2,890	2,400	3,150	2,870	11,700	3,440	4,800	2,800	2,740	2,340
13	2,480	4,500	2,880	2,520	3,040	2,720	11,200	3,560	5,240	2,580	2,600	2,700
14	2,400	4,580	2,700	2,300	2,880	2,970	11,500	3,380	4,600	2,600	2,560	2,560
15	2,430	4,910	2,490	2,000	2,690	3,200	11,700	4,620	4,480	2,600	2,400	2,530
16	2,490	4,630	2,350	2,320	2,730	4,080	12,000	5,100	4,840	2,590	2,700	2,550
17	2,520	3,500	2,430	2,600	2,780	6,640	12,200	5,050	4,940	2,600	2,720	2,500
18	2,180	3,160	2,310	2,670	2,820	8,120	12,200	5,020	4,950	2,790	2,560	2,620
19	2,340	3,300	2,460	2,850	3,080	9,220	12,400	5,640	4,450	3,080	2,560	2,340
20	2,520	3,430	2,310	2,700	3,200	9,570	12,700	9,650	4,050	3,210	2,580	2,550
21	2,050	3,600	2,530	2,880	3,110	9,580	12,700	13,600	4,130	3,210	2,520	2,540
22	2,030	3,780	2,430	2,670	3,050	9,810	12,700	14,800	3,540	3,230	2,460	2,500
23	2,120	4,000	2,470	2,580	3,030	9,840	12,700	14,000	3,110	3,270	2,650	2,650
24	2,290	4,120	2,420	2,740	2,960	9,970	12,400	13,700	2,930	3,260	2,560	2,600
25	2,200	4,200	2,480	2,600	2,990	10,200	12,200	13,500	3,420	3,220	2,540	2,460
26	2,420	4,300	2,520	2,760	3,000	10,500	11,700	13,200	3,800	3,280	2,670	2,270
27	2,510	4,410	2,450	2,740	3,000	10,700	11,200	13,200	3,650	5,040	2,580	2,510
28	2,220	4,480	2,500	2,730	2,920	10,700	11,000	13,000	3,440	4,540	2,560	2,530
29	2,480	4,540	2,480	2,760	....	10,600	10,500	12,700	3,280	3,810	2,560	2,470
30	2,350	4,600	2,430	2,720	....	10,400	10,100	12,400	3,000	3,550	2,470	2,540
31	2,650	....	2,590	2,610	....	10,500	....	12,200	....	3,480	2,560	....

NOTE.—Discharge ascertained from well-defined rating curve. Recording gage failed to operate Oct. 31 to Nov. 2, Feb. 10, Aug. 18, 19, 23, 24, 28–31, and Sept. 1–4, and 29; discharge estimated from load curve at Little Falls power plant, effective head, and probable seepage. Water surface fell below intake to water-stage recorder for a portion of each day Oct. 1–30; Nov. 3–5; Dec. 16, 18–20, 26, 29–30; Jan. 6, 10–12, 14, 15; Aug. 14, 21, 25; and Sept. 10–12, 14–17, 19, and 26; discharge based on (1) integration of recording gage graph, when water was above intake, and (2) approximate flow, when water was below intake, determined from German water meter at Little Falls power plant and probable waste and leakage at plant. Discharge determined by integrating recording gage graph, when recorder was running, except Apr. 1–30, May 20 to June 6. Discharge Apr. 1–30 and May 20 to June 6, determined by applying mean gage heights to rating table.

Monthly discharge of Spokane River below Little Falls, near Long Lake, Wash., for the year ending Sept. 30, 1915.

Month.	Discharge in second-feet.			Run-off (total in acre-feet).	Accuracy.
	Maximum.	Minimum.	Mean.		
October	2,650	2,030	2,370	146,000	B.
November	4,910	2,230	3,680	219,000	A.
December	4,660	2,310	2,860	176,000	B.
January	2,880	2,000	2,580	159,000	A.
February	3,600	2,550	2,940	163,000	A.
March	10,700	2,720	6,250	384,000	A.
April	12,700	10,100	11,700	696,000	A.
May	14,800	3,380	8,350	513,000	A.
June	11,700	2,930	5,810	346,000	A.
July	5,040	2,580	3,100	191,000	A.
August	3,320	2,400	2,660	164,000	A.
September	2,710	2,270	2,520	150,000	B.
The year	14,800	2,000	4,540	3,310,000	

ST. JOE RIVER AT AVERY, IDAHO.

Location.—In sec. 15, T. 45 N., R. 5 E., at Avery, in Shoshone County, half a mile below junction of North and South forks.

Drainage area.—Not measured.

Records available.—January 1, 1911, to September 30, 1915.

Gage.—Vertical and inclined staff installed September 18, 1912, on left bank 20 feet above suspension bridge, about 500 feet below Chicago, Milwaukee & St. Paul Railway depot; read twice daily to hundredths by W. H. Daugs. Original gage read January 1 to July 2, 1911, and May 13 to September 16, 1912, attached to old bridge pier a short distance below the Mountain View Hotel, about 700 feet below present site. Readings July 11, 1911, to May 10, 1912, made on gage in front of post office and about 100 feet below present gage.

Discharge measurements.—Made from the suspension bridge or by wading.

Channel and control.—Wide and shallow with steep gradient; bed of gravel and small boulders; shifting during floods.

Extremes of discharge.—Maximum stage recorded during year, 2.3 feet at 8 a. m. April 19 (discharge, 4,110 second-feet); minimum stage recorded, 0.35 foot at 6 p. m. September 5, and 8 a. m. September 20 (discharge, 320 second-feet).

1911-1915: Maximum stage recorded, 7.3 feet at 5 a. m. May 28, 1913 (discharge, 17,900 second-feet). Minimum flow probably occurs during winter, when discharge relation is seriously affected by ice. Data insufficient for estimating flow during January and February, 1911, or December, 1911, and January, 1912.

Winter flow.—Stage-discharge relation seriously affected by ice: flow estimated from observer's notes and records of precipitation and temperature.

Diversions.—Above all important diversions.

Regulation.—None.

Accuracy.—Results good at medium stages and fair at high and low water. Results poor during ice season.

Cooperation.—Gage-height record furnished by the United States Forest Service.

Discharge measurements of St. Joe River at Avery, Idaho, during the year ending Sept. 30, 1915.

[Made by C. O. Brown.]

Date.	Gage height.	Discharge.
	Feet.	*Sec.-ft.*
Mar. 17	0.81	935
May 25	1.54	2,250

Daily discharge, in second-feet, of St. Joe River at Avery, Idaho, for the years ending Sept. 30, 1914–15.

Day.	Oct.	Nov.	Dec.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.
1913–14.										
1	284	310	432	....	610	1,040	3,600	2,870	968	485
2	286	340	420	....	745	1,220	3,600	2,990	906	462
3	288	310	310	....	624	1,400	6,530	2,870	890	498
4	289	310	310	....	610	1,580	5,990	2,640	906	462
5	290	340	....	....	598	2,420	5,720	2,360	921	450
6	290	660	....	....	610	3,110	5,990	2,100	890	450
7	310	615	....	....	678	3,110	6,260	1,990	861	450
8	310	615	....	....	968	3,230	6,530	1,880	818	462
9	310	615	....	....	1,040	3.350	6,530	1,780	745	450
10	320	690	....	....	1,040	3,600	5,990	1,780	745	439
11	384	645	....	....	1,130	3,600	5,450	1,730	745	416
12	408	602	....	....	1,680	3,600	5,450	1,680	745	393
13	432	548	507	....	1,780	3,850	5,720	1,580	760	382
14	408	548	480	....	1,390	4,110	6,260	1,580	718	382
15	350	480	480	....	1,780	5,180	6,530	1,580	718	370
16	330	456	456	....	1,780	5,720	6,800	1,580	718	370
17	310	480	384	....	2,420	4,640	6,260	1,580	691	393
18	280	548	420	....	2,420	3,580	5,990	1,390	637	416
19	295	548	....	....	2,420	3,850	5,450	1,210	610	393
20	310	480	....	....	2,420	4,640	4,910	1,210	610	370
21	310	456	....	....	2,420	4,110	4,910	1,130	610	370
22	310	507	....	....	1,780	4,910	4,910	1,130	591	370
23	300	480	....	....	1,990	6,800	5,990	1,040	572	370
24	320	480	....	....	1,780	6,530	5,180	1,130	572	370
25	350	480	....	....	1,390	6,260	4,370	1,130	548	370
26	360	456	....	610	1,210	4,370	4,110	1,040	548	370
27	384	360	....	572	1,210	4,110	3,350	1,040	535	360
28	360	432	....	585	1,210	3,850	3,350	1,040	510	350
29	310	480	....	....	1,210	3,350	3,110	1,040	485	350
30	310	456	....	....	1,040	3,600	2,870	968	485	350
31	310	....	....	....	1,040	....	2,870	....	485	350

Daily discharge, in second-feet, of St. Joe River at Avery, Idaho, for the year ending Sept. 30, 1914–15—Continued.

Day.	Oct.	Nov.	Dec.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.
1914-15.											
1	416	637	861	......	462	1,300	1,900	2,100	890	548	340
2	416	952	803	......	485	1,390	1,880	1,990	876	535	330
3	416	2,640	983	......	498	2,100	1,880	1,780	832	485	340
4	416	2,100	968	......	598	2,420	1,780	1,680	818	485	330
5	428	1,580	921	......	637	2,310	1,780	1,680	818	474	330
6	416	1,390	818	......	498	2,200	1,580	1,580	803	474	350
7	416	1,260	745	......	439	2,100	1,680	1,580	803	474	360
8	416	1,130	......	......	439	2,200	1,680	1,390	803	462	350
9	393	1,080	......	......	485	1,990	1,780	1,580	818	450	462
10	416	1,040	......	......	485	1,990	1,880	1,580	774	439	393
11	485	1,390	......	......	510	1,880	1,990	1,780	745	428	370
12	462	1,990	......	......	498	2,640	1,880	1,780	718	416	393
13	485	3,350	......	......	522	3,350	1,780	1,680	691	416	382
14	450	3,850	......	......	560	3,350	1,780	1,580	732	416	382
15	462	2,800	......	......	774	3,110	1,780	1,390	718	428	370
16	462	2,100	......	......	936	3,110	1,780	1,390	730	474	360
17	485	1,700	......	......	921	3,350	1,780	1,390	745	462	350
18	510	1,550	......	......	921	3,850	2,310	1,300	732	393	350
19	560	1,450	......	......	952	4,110	2,870	1,300	678	382	350
20	610	1,260	......	......	968	4,110	2,870	1,300	610	370	330
21	585	1,150	......	......	1,010	3,600	2,870	1,210	598	370	330
22	535	1,080	......	......	1,040	3,110	2,530	1,210	585	416	340
23	535	1,040	......	......	1,210	2,640	2,200	1,210	560	393	350
24	498	1,040	......	......	1,580	2,420	2,420	1,130	548	370	340
25	510	1,030	......	585	1,300	2,200	2,310	1,130	560	370	350
26	485	1,040	......	572	1,130	1,990	2,200	1,130	548	370	360
27	474	1,040	......	560	1,130	1,990	2,100	1,040	560	370	450
28	474	1,130	......	510	1,040	1,990	2,420	1,010	560	360	382
29	485	1,210	......	......	1,130	1,990	2,310	952	560	360	370
30	485	983	......	......	1,210	2,100	2,200	890	572	350	350
31	585	......	......	......	1,130	......	2,200	......	585	350	......

Note.—Discharge ascertained as follows: Oct. 1, 1913, to Jan. 10, 1914, from a rating curve fairly well defined between 260 and 3,350 second feet; Jan. 11, 1914, to Sept. 30, 1915, from a rating curve fairly well defined between 500 and 3,350 second-feet; mean discharge estimated, because of ice, from observer's notes, records of precipitation and temperature, and one discharge measurement; Dec. 5–12, 1913, 420 second-feet; Dec. 19–31, 1913, 370 second-feet; Jan. 1–31, 1914, 470 second-feet; Feb. 1–25, 1915, 400 second-feet; Dec. 8–31, 1914, 580 second-feet; Jan. 1–31, 550 second-feet; Feb. 1–24, 1915, 570 second-feet. Discharge interpolated for lack of gage readings, Oct. 1–4, 19, 1913; Apr. 2–3, 8, May 6–7, 24, June 5–7, 11, 15, July 22, 1914, Nov. 7, 9, 15–21, 1915. Discharge estimated for lack of gage readings Dec. 4, 1913, Oct. 1–3, 1914. Discharge records from Oct. 1, 1913, to Aug. 31, 1914, supersede those published in Water-Supply Paper 392.

Monthly discharge of St. Joe River at Avery, Idaho, for the years ending Sept. 30, 1914–15.

Month.	Discharge in second-feet.			Run-off (total in acre-feet).	Accuracy.
	Maximum.	Minimum.	Mean.		
1913–14.					
October	432	280	326	20,000	B.
November	690	310	491	29,200	B.
December			399	24,500	D.
January			470	28,900	D.
February			420	23,300	D.
March	2,420	598	1,390	85,500	B.
April	6,800	1,040	3,830	228,000	C.
May	6,800	2,870	5,180	319,000	C.
June	2,990	968	1,640	97,600	B.
July	968	485	695	42,700	B.
August	498	350	402	24,700	C.
The period				931,000	
1914–15.					
October	610	393	476	29,300	C.
November	3,850	637	1,530	91,000	C.
December	983		646	39,700	C.
January			550	33,800	D.
February			568	31,500	D.
March	1,580	439	823	50,600	B.
April	4,110	1,300	2,560	152,000	B.
May	2,870	1,580	2,080	128,000	B.
June	2,100	890	1,420	84,500	B.
July	890	548	696	42,800	B.
August	548	350	422	25,900	C.
September	462	330	361	21,500	C.
The year	4,110	330	1,010	731,000	

SPOKANE VALLEY LAND & WATER CO.'S CANAL AT POST FALLS, IDAHO.

LOCATION.—In the NE. ¼ sec. 4, T. 50 N., R. 5 W. 1,200 feet below canal headgates, on right bank of Spokane River, and half a mile west of Post Falls, in Kootenai County.

RECORDS AVAILABLE.—May 20, 1911, to September 30, 1915.

GAGE.—Vertical staff on left side of flume, 1,200 feet below headgates; read once daily to hundredths by Emil Johnson. Prior to April 21, 1915, a vertical staff at end of flume, about 1,200 feet below present gage. Relation between gages not determined.

DISCHARGE MEASUREMENTS.—Made from footbridge at gage.

CHANNEL AND CONTROL.—Flume and canal section below gages shifts occasionally owing to influence of gravel bar at end of flume and plant growth.

EXTREMES OF DISCHARGE.—Maximum stage recorded during year, 2.25 feet August 11 to September 18 (discharge, 92 second-feet); minimum stage recorded, 1.7 feet February 14–24 (discharge, 29 second-feet).

1911–1915: Maximum stage recorded, 3.20 feet June 18–22, 1911 (discharge, 170 second-feet). No water in canal June 23–28, 1911, and January 7–9, 1912.

WINTER FLOW.—Stage-discharge relation not affected by ice.

ACCURACY.—Results excellent since installation of new gage. Results good at old station except when control was shifting.

COOPERATION.—Gage-height record furnished by Spokane Valley Land & Water Co.

Discharge measurements of Spokane Valley Light & Water Co.'s canal at Post Falls, Idaho, during the year ending Sept. 30, 1915.

Date.	Made by—	Gage height.	Discharge.	Date.	Made by—	Gage height.	Discharge.
		Feet.	*Sec.-ft.*			*Feet.*	*Sec.-ft.*
Feb. 18	Brown and Slack	1.72	30.2	Apr. 21	C. O. Brown	2.10	81.3
23	C. O. Brown	1.73	31.1	21	.....do	1.44	42.1
23	.....do	1.73	30.1				

Daily discharge, in second-feet, of Spokane Valley Land & Water Co.'s canal at Post Falls, Idaho, for the year ending Sept. 30, 1915.

Day.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept
1	47	41	35	35	33	33	49	62	88	88	88	92
2	47	41	35	35	33	33	49	62	88	88	88	92
3	47	41	35	35	33	33	49	62	88	88	88	92
4	47	41	35	35	33	33	49	62	88	88	88	92
5	47	39	35	35	33	33	49	62	88	88	88	92
6	47	39	35	35	33	33	52	62	88	88	88	92
7	47	39	35	35	33	33	52	62	88	88	88	92
8	46	39	35	35	33	33	52	74	88	88	88	92
9	46	39	35	35	33	33	52	74	88	88	88	92
10	46	39	35	35	33	33	52	74	88	88	88	92
11	46	39	35	35	33	33	55	74	88	88	92	92
12	46	38	35	35	33	33	55	74	88	88	92	92
13	46	38	35	33	33	33	55	74	88	88	92	92
14	46	38	35	33	29	33	55	74	88	88	92	92
15	45	38	35	33	29	33	55	74	88	88	92	92
16	45	38	35	33	29	33	58	74	88	88	92	92
17	45	38	35	33	29	33	58	74	88	88	92	92
18	45	38	35	33	29	33	58	74	88	88	92	92
19	45	37	35	33	29	33	58	74	88	88	92	88
20	45	37	35	33	29	44	58	74	88	88	92	88
21	45	37	35	33	29	44	62	74	88	88	92	88
22	43	37	35	33	29	44	62	74	88	88	92	88
23	43	37	35	33	29	44	62	74	88	88	92	88
24	43	37	35	33	29	44	62	74	88	88	92	88
25	43	37	35	33	33	47	62	81	88	88	92	88
26	43	36	35	33	33	47	62	81	88	88	92	88
27	43	36	35	33	33	47	62	81	88	88	92	88
28	43	36	35	33	33	47	62	81	88	88	92	88
29	41	36	35	33	....	47	62	81	88	88	92	88
30	41	36	35	33	....	47	62	81	88	88	92	88
31	41	....	35	33	....	47	....	81	....	88	92	....

NOTE.—Discharge ascertained as follows: Oct. 1 to Nov. 30, and Mar. 20 to Apr. 20, by method for shifting control; Dec. 1 to Mar. 19, from a rating curve well defined between 22 and 42 second-feet; Apr. 21 to Sept. 30, from a rating curve well defined up to 120 second-feet.

Monthly discharge of Spokane Valley Land & Water Co.'s canal at Post Falls, Idaho, for the year ending Sept. 30, 1915.

Month.	Discharge in second-feet.			Run-off (total in acre-feet).	Accuracy.
	Maximum.	Minimum.	Mean.		
October	47	41	44.8	2,750	C.
November	41	36	38.1	2,270	C.
December	35	35	35.0	2,150	B.
January	35	33	33.8	2,080	B.
February	33	29	31.4	1,740	B.
March	47	33	37.9	2,330	C.
April	62	49	56.3	3,350	C.
May	81	62	72.9	4,480	A.
June	88	88	88.0	5,240	A.
July	88	88	88.0	5,410	A.
August	92	88	90.7	5,580	A.
September	92	88	90.4	5,380	A.
The year	92	29	59.1	42,800	

SANPOIL RIVER AT KELLER, WASH.

Location.—In the NW. ¼ NW. ¼ sec. 9, T. 29 N., R. 33 E., just below highway bridge at Keller, in Ferry County, three-fourths mile below Silver Creek, and about 22 miles north of Wilbur.

Drainage area.—971 square miles.

Records available.—April 29, 1911, to September 30, 1915.

Gage.—Vertical staff on right bank 100 feet below bridge; read twice daily to hundredths by Mrs. Sadie McShane, October 1 to December 12; Miss Josie Blackshere, December 13 to February 15; Mrs. C. A. Sovereign, February 16 to September 30.

Discharge measurements.—Made from bridge or by wading.

Channel and control.—Rock and gravel; shifts at extremely high water. Some water carried through slough on right side during floods.

Extremes of discharge.—Maximum stage recorded during year, 3.2 feet 4.30 p. m. April 4 (discharge 1,080 second-feet); minimum stage recorded, 0.64 foot October 8 (discharge, 40 second-feet).

1911–1915: Maximum stage recorded, 4.2 feet at 6.30 a. m. April 17, 1914 (discharge, 1,650 second-feet); minimum stage recorded, 0.45 foot at 7 a. m. and 4 p. m. September 1, 1914 (discharge, 26 second-feet.)

Winter flow.—Stage-discharge relation seriously affected by ice; flow estimated from observer's notes, discharge measurements, and records of precipitation and temperature.

Diversions.—None.

Regulation.—None.

Accuracy.—Results excellent or good between limits of well and fairly well defined rating curves; poor during winter season. Practically no diurnal fluctuation.

Discharge measurements of Sanpoil River at Keller, Wash., during the year ending Sept. 30, 1915.

Date.	Made by—	Gage height.	Discharge.	Date.	Made by—	Gage height.	Discharge.
		Feet.	*Sec.-ft.*			*Feet.*	*Sec.-ft.*
Mar. 25	C. O. Brown	2.62	750	June 27	C. O. Brown	1.73	322
25	....do	2.63	760	Sept. 24	G. L. Parker	.70	58

Daily discharge, in second-feet, of Sanpoil River at Keller, Wash., for the year ending Sept. 30, 1915.

Day.	Oct.	Nov.	Dec.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.
1	50	85	108	......	139	743	604	992	268	160	62
2	55	83	112	......	135	797	604	934	250	150	61
3	55	81	81	......	140	963	578	878	250	146	61
4	56	78	85	......	150	1,080	552	822	232	141	59
5	57	112	......	......	163	1,050	526	766	250	137	59
6	60	112	......	......	166	992	526	712	232	133	58
7	60	108	......	......	172	934	500	712	232	124	58
8	40	108	......	......	172	878	500	658	232	120	58
9	42	104	......	......	177	878	475	631	250	112	58
10	45	102	......	......	183	878	475	604	232	108	58
11	45	100	......	......	189	822	450	604	232	102	58
12	48	100	......	......	189	766	450	578	216	97	58
13	50	100	......	......	192	766	425	552	200	95	59
14	55	102	......	......	195	822	475	552	197	90	62
15	61	100	......	......	249	822	526	552	197	86	65
16	71	98	......	......	408	822	526	526	192	83	65
17	81	98	......	......	479	766	526	475	192	80	64
18	85	100	......	......	479	766	552	450	200	77	62
19	81	100	......	......	505	766	712	425	197	77	59
20	112	98	......	......	531	766	822	425	192	80	58
21	108	100	......	......	531	712	992	400	186	77	57
22	104	100	......	......	583	658	1,050	400	172	77	57
23	100	100	......	......	689	631	1,050	376	160	75	57
24	135	98	......	......	743	604	1,050	352	155	74	58
25	96	100	......	112	743	604	1,050	330	146	74	57
26	83	100	......	110	689	578	1,050	330	137	71	57
27	76	98	......	112	635	552	1,050	330	128	71	58
28	74	98	......	121	609	500	1,050	308	133	68	58
29	74	98	......	......	609	500	1,050	288	127	65	58
30	81	102	......	......	609	552	1,050	268	160	65	57
31	85	......	......	......	635	......	1,050	......	165	62	......

NOTE.—Discharge ascertained as follows: Oct. 1 to Apr. 4, from a rating curve well defined between 20 and 800 second-feet; Apr. 5 to Sept. 30, from a rating curve fairly well defined. Discharge estimated, because of ice, from observer's notes and records of precipitation and temperature, Dec. 5-14, 80 second-feet; Dec. 15-23, 70 second-feet; Dec. 24-31, 85 second-feet; Jan. 1-10, 90 second-feet; Jan. 11-20, 85 second-feet; Jan. 21-31, 80 second-feet; Feb. 1-8, 95 second-feet; Feb. 9-16, 105 second-feet; Feb. 17-24, 110 second-feet.

Monthly discharge of Sanpoil River at Keller, Wash., for the year ending Sept. 30, 1915.

Month.	Discharge in second-feet.			Run-off (total in acre-feet).	Accuracy.
	Maximum.	Minimum.	Mean.		
October	135	40	71.8	4,410	A.
November	112	78	98.8	5,880	A.
December	108	....	80.5	4,950	D.
January	....	....	84.8	5,210	D.
February	121	....	105	5,830	D.
March	743	130	389	23,900	A.
April	1,080	500	766	45,600	B.
May	1,050	425	719	44,200	B.
June	992	268	541	32,200	B.
July	268	127	197	12,100	B.
August	160	62	96.0	5,900	B.
September	65	57	59.2	3,520	B.
The year	1,080	40	268	194,000	

NESPELEM RIVER AT NESPELEM, WASH.

Location.—In the SE. ¼ sec. 24, T. 31 N., R. 30 E., at United States Indian Office gaging bridge, about half a mile above Nespelem, in Okanogan County, about 5 miles above Little Nespelem River and 6 miles above the mouth.

Drainage area.—122 square miles (measured on Colville Indian Reservation map, edition of 1911).

Records available.—May 1, 1911, to September 30, 1915.

Gage.—Vertical staff attached to overhanging tree on left bank at gaging bridge; read once daily to hundredths by Mrs. C. T. Kronk. Prior to July 30, 1913, station was about 1,000 feet upstream at different datum.

Discharge measurements.—Made from gaging bridge or by wading.

Channel and control.—Gravel and boulders; shifting; aquatic growth during summer months. Right bank flat, subject to overflow at gage height 4.0 feet. Left bank high, not subject to overflow. Zero flow would occur at gage height 0.25 foot±0.10 foot, as determined September 22, 1915.

Extremes of discharge.—Maximum stage recorded during year, 3.52 feet at 5.35 p. m. April 4 (discharge, 255 second-feet); minimum stage recorded, 0.72 foot August 27 to September 4 (discharge, 9.1 second-feet).

1911–1915: Maximum stage recorded, 4.75 feet at 9 a. m. April 16, 1914 (discharge, 442 second-feet); minimum stage recorded, 1.00 foot August 6–7, August 13 to September 28, 1913, and October 1–5, 1913 (discharge, 7.0 second-feet).

Winter flow.—Stage-discharge relation seldom affected by ice.

Diversions.—Above all diversions.

Accuracy.—Results fair for periods of extremely low discharge, owing to poorly defined rating curves; excellent for high stages.

Discharge measurements of Nespelem River at Nespelem, Wash., during the year ending Sept. 30, 1915.

Date.	Made by—	Gage height.	Discharge.	Date.	Made by—	Gage height.	Discharge.
		Feet.	*Sec.-ft.*			*Feet.*	*Sec.-ft.*
Mar. 21	C. O. Brown	2.26	122	Apr. 8	C. O. Brown	3.32	232
22	.....do	2.34	128	June 26	.....do	1.36	50.2
23	.....do	2.46	139	26	.....do	1.35	48.9
23	.....do	2.50	143	Sept. 22	G. L. Parker	.80	11.5
Apr. 7	.....do	3.34	235				

Daily discharge, in second-feet, of Nespelem River at Nespelem, Wash., for the year ending Sept. 30, 1915.

Day.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.
1	9.6	14	19	14	13	29	174	134	124	44	27	9.1
2	10	15	20	14	14	29	185	119	119	42	21	9.1
3	10	15	20	15	14	28	243	114	114	40	20	9.1
4	10	15	21	15	14	40	255	93	110	41	19	9.1
5	10	16	20	15	15	38	255	93	101	41	18	9.4
6	10	17	20	16	15	37	243	101	93	40	18	9.7
7	10	18	20	16	16	40	231	93	89	39	17	10
8	10	18	19	16	16	40	231	89	89	40	17	10
9	10	18	18	16	16	42	219	93	81	41	15	11
10	10	18	17	16	16	43	219	93	81	40	14	11
11	10	18	16	16	15	44	207	93	85	40	14	12
12	10	18	15	16	15	48	196	93	81	38	13	12
13	10	18	14	16	14	49	207	93	81	37	13	12
14	10	20	13	16	13	54	196	93	77	36	13	13
15	10	18	13	16	13	63	185	93	70	36	13	13
16	10	18	13	15	13	72	174	97	66	35	11	13
17	11	18	12	15	14	91	174	101	62	36	11	13
18	11	18	12	15	14	101	174	119	62	39	11	13
19	13	18	12	15	14	106	164	144	59	38	10	13
20	13	18	12	15	15	116	164	134	59	36	10	12
21	13	18	12	14	15	124	154	134	56	36	10	12
22	16	19	12	14	15	134	154	119	56	35	9.7	12
23	15	18	12	14	16	144	154	110	52	34	9.4	11
24	13	18	12	13	16	164	144	124	52	29	9.4	11
25	13	18	12	13	20	174	134	134	49	22	9.4	11
26	13	18	12	13	27	154	124	134	49	18	9.4	11
27	13	18	12	13	24	144	124	144	49	20	9.1	11
28	13	18	13	13	26	144	124	144	49	22	9.1	11
29	13	18	13	13	......	144	134	134	49	29	9.1	11
30	13	18	13	13	......	144	134	134	46	32	9.1	12
31	13	......	13	13	......	154	......	124	......	30	9.1	......

NOTE.—Discharge ascertained as follows: Oct. 1 to Mar. 20, and Mar. 21 to June 30, from rating curves well defined above 40 second-feet; July 1 to Aug. 15, by method for shifting control; Aug. 16 to Sept. 30, from a rating curve fairly well defined above 40 second-feet.

Monthly discharge of Nespelem River at Nespelem, Wash., for the year ending Sept. 30, 1915.

Month.	Discharge in second-feet.			Run-off (total in acre-feet).	Accuracy.
	Maximum.	Minimum.	Mean.		
October	16	9.6	11.5	707	C.
November	20	14	17.6	1,050	C.
December	21	12	14.9	916	C.
January	16	13	14.6	898	C.
February	27	13	16.0	889	C.
March	174	28	88.2	5,420	A.
April	255	124	183	10,900	A.
May	144	89	113	6,950	A.
June	124	46	73.7	4,390	A,
July	44	18	35.0	2,150	B.
August	27	9.1	13.2	812	C.
September	13	9.1	11.2	666	C.
The year	255	9.1	49.4	35,700	

OKANOGAN RIVER AT OKANOGAN, WASH.

Location.—In sec. 16, T. 33 N., R. 26 E., at Okanogan, in Okanogan County, a quarter of a mile above Salmon Creek.

Drainage area.—7,740 square miles (measured on topographic, Okanogan National Forest, Colville Indian Reservation, and Canadian railway belt maps).

Records available.—May 10, 1911, to September 30, 1915.

Gage.—Vertical staff attached to steamboat dock on left bank at Okanogan; read once daily to hundredths by J. B. Gordon.

Discharge measurements.—Made from a boat at gage or from Omak highway bridge 4 miles upstream.

Channel and control.—Large boulders and cobble stones; shifting at extremely high stages. Banks fairly high, one channel at all stages.

Extremes of discharge.—Maximum stage recorded during year, 7.0 feet May 26 (discharge, 7,220 second-feet); minimum discharge estimated as 900 second-feet January 25–28 during period of ice affect.

1911–1915: Maximum stage recorded, 11.2 feet at 4 p. m. June 5, and at 10.30 a. m., and 1.30 p. m. June 6, 1913 (discharge, 17,600 second-feet); minimum stage recorded, 1.9 feet September 14–15, 1911 (discharge, 720 second-feet).

Winter flow.—Stage-discharge relation seriously affected by ice; flow estimated from observer's notes, discharge measurements, and records of precipitation and temperature.

Diversions.—Numerous small ditches divert for irrigation above the station.

Regulation.—None.

Accuracy.—Results excellent except those for ice season.

Cooperation.—Gage-height record furnished by United States Forest Service.

Discharge measurements of Okanogan River at Okanogan, Wash., during the year ending Sept. 30, 1915.

Date.	Made by—	Gage height.	Discharge.	Date.	Made by—	Gage height.	Discharge.
		Feet.	*Sec.-ft.*			*Feet.*	*Sec.-ft.*
Feb. 1	J. T. Hartson..........	2.55	987	May 31	J. T. Hartson..........	6.64	6,440
May 26	.....do..................	6.97	6,990	Aug. 10	C. O. Brown...........	3.51	2,090

Daily discharge, in second-feet, of Okanogan River at Okanogan, Wash., for the year ending Sept. 30, 1915.

Day.	Oct.	Nov.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.
1	1,270	1,270	....	1,040	1,270	4,420	6,300	3,160	2,590	1,360
2	1,270	1,360	....	1,040	1,360	4,200	6,130	3,030	2,650	1,270
3	1,270	1,360	....	1,040	1,450	3,990	5,960	3,000	2,650	1,270
4	1,270	1,450	....	1,040	1,840	3,850	5,800	2,980	2,650	1,270
5	1,270	1,540	....	1,040	2,060	3,990	5,480	2,950	2,530	1,270
6	1,270	1,540	....	1,040	2,180	3,990	5,640	2,930	2,410	1,270
7	1,270	1,640	....	1,040	2,300	4,130	5,800	2,900	2,300	1,270
8	1,270	1,540	....	1,040	2,300	4,570	5,800	2,900	2,240	1,190
9	1,270	1,540	....	1,040	2,410	4,870	5,480	2,770	2,180	1,190
10	1,190	1,540	....	965	2,410	5,170	5,180	2,770	2,060	1,190
11	1,270	1,540	....	1,040	2,300	5,320	4,870	2,710	2,060	1,190
12	1,270	1,540	....	1,040	2,300	5,170	4,720	2,650	1,960	1,190
13	1,270	1,540	....	1,040	2,410	4,870	4,720	2,530	1,960	1,190
14	1,270	1,740	....	1,040	2,770	4,720	4,720	2,530	1,840	1,190
15	1,270	1,670	....	1,040	3,030	4,870	4,570	2,650	1,840	1,190
16	1,270	1,600	....	1,040	3,030	4,870	4,570	2,770	1,740	1,190
17	1,270	1,540	....	1,040	3,160	4,870	4,420	2,770	1,740	1,190
18	1,270	1,450	....	1,110	3,660	4,720	4,270	2,770	1,740	1,190
19	1,270	1,450	....	1,090	4,160	5,020	4,130	2,770	1,740	1,190
20	1,360	1,450	....	1,080	4,670	5,800	3,990	2,770	1,640	1,110
21	1,360	1,450	....	1,060	5,170	6,480	3,850	2,650	1,640	1,110
22	1,360	1,540	....	1,040	5,170	6,660	3,710	2,650	1,640	1,110
23	1,360	1,540	....	1,040	4,570	6,750	3,710	2,530	1,540	1,110
24	1,360	1,540	1,040	1,110	4,420	6,840	3,570	2,410	1,540	1,110
25	1,360	1,540	1,040	1,110	4,280	6,840	3,570	2,300	1,540	1,110
26	1,360	1,500	1,040	1,190	4,130	7,220	3,430	2,180	1,450	1,110
27	1,270	1,450	1,040	1,190	4,130	6,840	3,360	2,180	1,450	1,110
28	1,270	....	1,040	1,190	4,130	6,660	3,290	2,300	1,450	1,110
29	1,270	....	....	1,190	4,130	6,840	3,290	2,300	1,360	1,110
30	1,270	....	....	1,190	4,130	6,750	3,160	2,530	1,360	1,110
31	1,270	....	....	1,190	....	6,660	....	2,530	1,360	....

NOTE.—Discharge ascertained from rating curve well defined from 800 to 15,000 second-feet. Discharge interpolated, for lack of gage readings, Oct. 18, 24; Nov. 15, 16, 26; Mar. 14, 19–21, 28; Apr. 6, 18–20, 25; May 2, 16, 23, 30; June 6, 10, 13, 20, 21, 27; July 3–6, 11, 15, 25; Aug. 1, 8, and Sept. 26. Discharge estimated, because of ice, from observer's notes, records of precipitation and temperature and one discharge measurement, Nov. 28–30, 1,420 second-feet; Dec. 1–10, 1,260 second-feet; Dec. 11–20, and 21–30, 1,040 second-feet; Jan. 1–10, 1,020 second-feet; Jan. 11–20, 960 second-feet; Jan. 21–31, 940 second-feet; Feb. 1–10, 1,060 second-feet; Feb. 11–20, 1,110 second-feet; Feb. 21–23, 1,040 second-feet.

Monthly discharge of Okanogan River at Okanogan, Wash., for the year ending Sept. 30, 1915.

Month.	Discharge in second-feet.			Run-off (total in acre-feet).	Accuracy.
	Maximum.	Minimum.	Mean.		
October	1,360	1,270	1,290	79,300	A.
November	1,740	1,270	1,500	89,300	A.
December	....	....	1,110	68,200	C.
January	....	....	972	59,800	C.
February	....	....	1,070	59,400	C.
March	1,190	965	1,080	66,400	A.
April	5,170	1,270	3,180	189,000	A.
May	7,220	3,850	5,420	333,000	A.
June	6,300	3,160	4,580	273,000	A.
July	3,160	2,180	2,670	164,000	A.
August	2,650	1,360	1,900	117,000	A.
September	1,360	1,110	1,180	70,200	A.
The year	7,220	....	2,170	1,570,000	

SIMILKAMEEN RIVER NEAR OROVILLE, WASH.

Location.—In the SE. ¼ sec. 13, T. 40 N., R. 25 E., at the Similkameen Power Co.'s plant, 4 miles above Oroville, 5 miles above the mouth, and below all tributaries.

Drainage area.—3,450 square miles (measured on topographic and Canadian railway belt maps).

Records available.—May 14, 1911, to September 30, 1915.

Gage.—Vertical staff in 7 sections on left bank, 3 sections 15 feet above tailrace and 4 sections nailed to power house; read to hundredths twice daily by G. M. Raburn.

Discharge measurements.—Made from highway bridge at Oroville, 4 miles below gage.

Channel and control.—River flows through narrow, solid rock canyon at gage and control; practically permanent. Banks high, not subject to overflow. Lower falls (25 feet high), 150 feet above gage.

Extremes of discharge.—Maximum stage recorded during year, 8.68 feet at 5.30 p. m. May 30 (discharge, 5,900 second-feet); minimum estimated at 260 second-feet January 20–21 during period when stage-discharge relation was affected by ice.

1911–1915: Maximum stage recorded, 16.9 feet at 7.30 a. m. and 5 p. m. June 4, 1913 (discharge, 17,900 second-feet); minimum discharge, January 20–21, 1915.

Winter flow.—Stage-discharge relation seriously affected by ice; flow estimated from observer's notes, records of precipitation and temperature, and discharge measurements.

Diversions.—Some diversion for irrigation from tributaries above station.

Cooperation.—Gage-height record furnished by the Similkameen Power Co.

Discharge measurements of Similkameen River near Oroville, Wash., during the year ending Sept. 30, 1915.

Date.	Made by—	Gage height.	Discharge.	Date.	Made by—	Gage height.	Discharge.
		Feet.	*Sec.-ft.*			*Feet.*	*Sec.-ft.*
Jan. 31	J. T. Hartson	[a]1.51	404	June 1	J. T. Hartson	7.19	4,320
May 25	.....do	8.52	5,780	Aug. 7	C. O. Brown	3.08	1,260
27	.....do	7.88	5,110				

[a] Stage-discharge relation affected by ice.

Daily discharge, in second-feet, of Similkameen River near Oroville, Wash., for the year ending Sept. 30, 1915.

Day.	Oct.	Nov.	Dec.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.
1	602	642	865	....	404	602	3,160	4,350	1,750	1,510	526
2	602	685	865	....	404	642	2,910	4,250	1,690	1,630	526
3	602	730	820	....	404	910	2,750	3,970	1,690	1,510	526
4	602	820	775	....	404	1,390	2,910	3,520	1,690	1,450	526
5	602	865	775	....	404	1,630	2,990	3,520	1,690	1,390	526
6	602	910	775	420	404	1,510	3,160	4,060	1,690	1,210	490
7	602	865	730	420	404	1,570	3,520	4,250	1,690	1,160	454
8	564	865	685	454	404	1,570	3,970	4,060	1,630	1,110	454
9	564	865	685	454	404	1,510	4,150	3,790	1,570	1,110	454
10	564	865	526	454	404	1,510	4,450	3,430	1,450	1,060	454
11	602	865	526	437	404	1,510	4,250	3,250	1,390	1,010	454
12	602	865	526	420	404	1,630	3,790	3,160	1,330	960	490
13	642	960	....	420	404	1,810	3,520	3,070	1,330	910	490
14	642	1,010	....	404	388	2,070	3,520	3,070	1,330	865	490
15	602	960	....	404	388	2,070	3,610	2,990	1,510	820	490
16	602	865	....	388	388	2,210	3,610	2,910	1,690	820	490
17	602	820	....	388	404	2,670	3,520	2,830	1,630	775	490
18	642	775	....	388	404	3,340	3,880	2,750	1,630	775	490
19	642	775	....	404	420	3,790	4,450	2,750	1,570	775	454
20	642	775	....	404	437	4,350	5,150	2,510	1,510	730	454
21	685	775	....	404	437	4,350	5,590	2,280	1,390	730	454
22	685	775	....	404	454	3,880	5,590	2,210	1,330	685	454
23	642	820	....	388	454	3,430	5,590	2,140	1,270	685	454
24	642	820	....	404	490	3,250	5,370	2,140	1,160	642	454
25	642	820	....	404	564	3,070	5,700	2,280	1,110	642	454
26	602	820	....	404	602	3,070	5,590	2,210	1,160	602	490
27	602	865	....	404	602	3,160	5,050	2,000	1,160	602	490
28	602	910	....	404	564	3,070	5,150	1,930	1,270	564	454
29	602	910	....	....	564	3,070	5,480	1,930	1,390	564	454
30	602	910	....	....	602	3,430	5,810	1,810	1,450	526	454
31	642	....	....	....	602	....	4,550	....	1,450	526	....

NOTE.—Discharge ascertained from a rating curve well defined between 500 and 15,000 second-feet. Discharge estimated, because of ice, from observer's notes, records of precipitation and temperature, and one discharge measurement: Dec. 13–20, 470 second-feet; Dec. 21–31, 440 second-feet; Jan. 1–10, 390 second-feet; Jan. 11–20, 320 second-feet; Jan. 21–31, 320 second-feet, and Feb. 1–5, 400 second-feet.

Monthly discharge of Similkameen River near Oroville, Wash., for the year ending Sept. 30, 1915.

Month.	Discharge in second-feet.			Run-off (total in acre-feet).	Accuracy.
	Maximum.	Minimum.	Mean.		
October	685	564	615	37,800	A.
November	1,010	642	840	50,000	A.
December	865	....	553	34,000	B.
January	....	....	343	21,100	C.
February	454	....	410	22,800	B.
March	602	388	452	27,800	B.
April	4,350	602	2,400	143,000	A.
May	5,810	2,750	4,280	263,000	A.
June	4,350	1,810	2,980	177,000	A.
July	1,750	1,110	1,470	90,400	A.
August	1,630	526	914	56,200	A.
September	526	454	478	28,400	A.
The year	5,810	....	1,320	952,000	

SALMON CREEK NEAR CONCONULLY,[1] WASH.

Location.—In sec. 18, T. 35 N., R. 25 E., half a mile below Conconully reservoir of Okanogan project of United States Reclamation Service, 2 miles south of Conconully and about 14 miles above Okanogan, in Okanogan County.

Drainage area.—121 square miles (revised value); 152 square miles at Jones ranch.

Records available.—July 6, 1910, to September 30, 1915. From May 27, 1903, to March 31, 1912, records were obtained at Jones ranch in sec. 31, T. 34 N., R. 26 E., about 6 miles above Okanogan.

Gage.—Vertical staff indicating head on weir half a mile below the reservoir; read daily to hundredths by Allen Honey.

Discharge measurements.—Made from footbridge near gage.

Channel and control.—20-foot rectangular, sharp-crested weir with two end contractions; prior to October 1, 1912, a 20-foot Cippoletti weir was used.

Extremes of discharge.—Maximum stage recorded during year, 2.45 feet May 29 (discharge, 292 second-feet); minimum stage recorded, 0.08 foot October 1–3, 6–31, and November 1–4 (discharge, 1.7 second-feet).

1903–1915: Maximum stage recorded, 3.63 feet April 29, 1904 (discharge, 577 second-feet). No flow 4 p. m. October 3 to 6 p. m. October 11, 1910, when water was being stored in Salmon Lake and Conconully reservoirs.

Winter flow.—Stage-discharge relation not affected by ice.

Diversions.—None.

Regulation.—Flow completely controlled by storage in Salmon Lake reservoir, capacity 2,600 acre-feet, and Conconully reservoir, capacity 13,000 acre-feet. Monthly summaries of flow for 1912–1915 have been corrected for storage.

Accuracy.—Stage-discharge relation permanent. Results excellent.

Cooperation.—Field data furnished by United States Reclamation Service.

Discharge measurements of Salmon Creek near Conconully, Wash., during the year ending Sept. 30, 1915.

Date.	Made by—	Gage height.	Discharge.
		Feet.	*Sec.-ft.*
May 29	J. T. Hartson	2.35	272
30	.....do	2.11	226
Sept. 4	Casteel and Edwards	1.06	74.5

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[1] Formerly described as near Okanogan.

Daily discharge, in second-feet, of Salmon Creek near Conconully, Wash., for the year ending Sept. 30, 1915.

Day.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.
1	1.7	1.7	2.1	2.1	2.8	2.8	3.2	67	166	108	117	108
2	1.7	1.7	2.1	2.1	2.8	2.8	3.2	58	171	110	116	102
3	1.7	1.7	2.1	2.1	2.8	2.8	3.2	52	176	112	124	94
4	3.8	1.7	2.1	2.1	2.8	2.8	3.2	54	170	112	121	78
5	6.7	1.9	2.1	2.1	2.8	2.8	3.2	56	153	85	122	2.8
6	1.7	2.1	2.1	2.1	2.8	2.8	3.6	58	153	22	124	2.5
7	1.7	2.1	2.1	2.1	2.8	2.8	3.6	61	152	108	124	1.9
8	1.7	2.1	2.1	2.8	2.8	2.8	3.6	68	147	112	121	1.9
9	1.7	2.1	2.1	2.8	2.8	2.8	3.6	73	122	104	120	1.9
10	1.7	2.1	2.1	2.8	2.8	2.8	3.6	92	119	101	115	1.9
11	1.7	2.1	2.1	2.8	2.8	2.8	3.6	117	132	99	113	1.9
12	1.7	2.1	2.1	2.8	2.8	2.8	4.0	125	127	98	112	1.9
13	1.7	2.1	2.1	2.8	2.8	2.8	4.0	125	114	91	110	1.9
14	1.7	2.1	2.1	3.2	2.8	2.8	4.0	125	114	82	110	1.9
15	1.7	2.1	2.1	3.2	2.8	2.8	4.3	141	113	78	110	2.1
16	1.7	2.1	2.1	2.8	2.8	2.8	4.3	149	106	75	111	2.1
17	1.7	2.1	2.1	2.8	2.8	2.8	4.7	149	106	71	121	2.1
18	1.7	2.1	2.1	2.8	2.8	2.8	4.7	149	106	71	122	2.5
19	1.7	2.1	2.1	2.8	2.8	2.8	5.1	153	107	72	124	2.5
20	1.7	2.1	2.1	2.8	2.8	2.8	5.1	162	109	83	122	2.5
21	1.7	2.1	2.1	2.8	2.8	2.8	5.1	162	111	93	122	2.5
22	1.7	2.1	2.1	2.8	2.8	2.8	5.4	173	121	95	122	2.5
23	1.7	2.1	2.1	2.8	2.8	2.8	5.8	229	123	104	121	2.5
24	1.7	2.1	2.1	2.8	2.8	2.8	5.8	250	124	110	115	2.8
25	1.7	2.1	2.1	2.8	2.8	2.8	6.3	270	121	118	114	2.8
26	1.7	2.1	2.1	2.8	2.8	2.8	12	270	120	121	116	2.8
27	1.7	3.2	2.1	2.8	2.8	2.8	34	270	118	115	118	2.8
28	1.7	2.1	2.1	2.8	2.8	2.8	47	273	113	120	118	2.8
29	1.7	2.1	2.1	3.2	....	2.8	74	292	105	122	118	2.5
30	1.7	2.1	2.1	3.2	....	2.8	73	252	109	119	117	2.5
31	1.7	....	2.1	3.2	....	3.2	....	226	....	117	111	....

NOTE.—Discharge ascertained from a well-defined rating curve Oct. 3–4, Apr. 26–30, May 1–11, 15, 19, 22, 24, 28, 30–31, June 1–2, 4, 8–10, 12, 15, 19, 21–24, 26–30, July 1–2, 4–20, 22–31, Aug. 2–5, 7, 9, 11–12, 16, 18, 19, 23–26, 30–31, Sept. 1–4, by weighting discharge between time of outlet gage changes at Conconully reservoir.

Monthly discharge of Salmon Creek near Conconully, Wash..

Month.	Discharge in second-feet.			Run-off in acre-feet.			Discharge without storage, in second-feet.	Accuracy of observed discharge.
	Maximum.	Minimum.	Mean.	Observed.	Stored.	Without storage.		
1911-12.								
October	10.0	1.2	4.61	283	+ 98	381	6.18	B.
November	4.7	1.5	2.71	161	+ 256	417	7.01	B.
December	1.5	1.5	1.50	92.2	+ 693	785	12.8	B.
January	1.7	.8	1.26	77.5	+ 310	388	6.31	B.
February	.8	.8	.80	46.0	+ 267	313	5.44	B.
March	1.5	.8	1.21	74.4	+ 408	482	7.84	B.
April	7.5	1.5	2.29	136	+1,050	1,190	20.0	B.
May	108	2.1	24.9	1,530	+5,880	7,410	121	A.
June	126	8.6	96.8	5,760	− 641	5,120	86.0	A.
July	115	6.5	86.7	5,330	−3,540	1,790	29.1	A.
August	103	1.9	68.7	4,220	−3,280	940	15.3	A.
September	4.8	1.3	2.15	128	+ 346	474	7.97	B.
The year	126	.8	24.6	17,800	+1,850	19,700	27.1	
1912-13.								
October	8.4	1.7	5.27	324	+ 442	766	12.5	A.
November	1.7	1.7	1.70	101	+ 386	487	8.18	A.
December	2.5	1.7	1.78	109	+ 422	531	8.64	A.
January	1.9	1.5	1.71	105	+ 272	377	6.13	A.
February	1.9	1.7	1.89	105	+ 186	291	5.24	A.
March	14.8	1.9	2.96	182	+ 166	348	5.66	A.
April	9.2	2.1	5.86	349	+ 944	1,290	21.7	A.
May	79	8.9	46.4	2,850	+3,650	6,500	106	A.
June	105	9.4	67.0	3,990	+3,260	7,250	122	A.
July	120	82	92.3	5,680	−3,500	2,180	35.5	A.
August	110	94	99.9	6,140	−5,170	970	15.8	A.
September	82	1.9	5.33	317	− 64	253	4.25	A.
The year	120	1.5	28.0	20,300	+ 994	21,200	29.3	
1913-14.								
October	5.7	1.9	3.47	213	+ 294	507	8.25	A.
November	4.7	1.9	2.04	121	+ 413	534	8.97	A.
December	1.9	1.9	1.90	117	+ 268	385	6.26	A.
January	2.1	1.9	2.07	127	+ 554	681	11.1	A.
February	2.1	2.1	2.10	117	+ 237	354	6.37	A.
March	2.5	2.1	2.27	140	+ 449	589	9.58	A.
April	3.9	2.5	3.01	179	+4,260	4,440	74.6	A.
May	246	3.9	114	7,010	+5,620	12,600	205	A.
June	243	93	156	9,280	− 153	9,130	153	A.
July	125	91	104	6,400	−4,270	2,130	34.6	A.
August	119	72	108	6,640	−6,240	400	6.50	A.
September	90	1.7	5.66	337	+ 222	115	1.93	A.
The year	246	1.7	42.4	30,700	+1,650	31,900	44.1	
1914-15.								
October	6.7	1.7	1.93	119	+ 943	1,060	17.2	A.
November	3.2	1.7	2.08	124	+1,000	1,120	18.8	A.
December	2.1	2.1	2.10	129	+ 524	653	10.6	A.
January	3.2	2.1	2.71	167	+ 417	584	9.50	A.
February	2.8	2.8	2.80	156	+ 390	546	9.83	A.
March	3.2	2.8	2.81	173	+1,020	1,190	19.4	A.
April	74	3.2	11.5	684	+5,320	6,000	101	A.
May	292	52	152	9,350	+1,040	10,400	169	A.
June	176	105	128	7,620	− 933	6,690	112	A.
July	122	22	97.7	6,010	−2,850	3,160	51.4	A.
August	124	110	118	7,260	−6,290	970	158	A.
September	108	1.9	14.8	881	− 742	139	2.33	A.
The year	292	1.7	45.0	32,700	− 161	32,500	44.9	

NOTE.—Monthly discharge 1912-1914 supersedes that published in Water-Supply Papers 362 and 392. Records previously published were not corrected for storage in Salmon Lake reservoir.

METHOW RIVER AT PATEROS, WASH.

Location.—In sec. 35, T. 30 N., R. 23 E., three -fourths mile above county highway bridge at Pateros, in Okanogan County, and a mile above the mouth of stream.

Drainage area.—1,850 square miles (measured on topographic and Forest Service maps).

Records available.—May 3, 1903, to September 30, 1915.

Gage.—Inclined and vertical staff gage on left bank 500 feet below observer's house and three-fourths mile above the county highway bridge; read twice daily to hundredths by F. W. Robinson. Prior to June 17, 1903, the gage was half a mile downstream, but all gage heights have been reduced to present datum.

Discharge measurements.—Made from cable 1,000 feet upstream or by wading.

Channel and control.—Bed of stream composed of large boulders and gravel; shifts at extremely high stages. One channel at all stages. Right bank high and not subject to overflow; left bank not subject to overflow below gage height 12 feet.

Extremes of discharge.—Maximum stage recorded during year, 7.95 feet at 5 p. m. April 20 (discharge, 5,200 second-feet); minimum stage recorded, 4.0 feet February 16, 18–23, 26–28, March 1–3, and 7–8 (discharge, 360 second-feet; discharge may have been less at times when ice was present).

1903–1915: Maximum stage recorded, 11.6 feet, May 11, 1910 (discharge, 14,800 second-feet); minimum flow estimated at 230 second-feet, February 5 and 6, 1914, during period of ice effect.

Winter flow.—Stage-discharge relation seriously affected by ice; flow estimated from discharge measurements, observer's notes, and records of precipitation and temperature.

Diversions.—Many small ditches divert for irrigation above station.

Regulation.—None.

Accuracy.—Stage-discharge relation changed by high water of April 20 and seriously affected by ice December 15 to February 15. Results fair for ice season and excellent for rest of year.

Discharge measurements of Methow River at Pateros, Wash., during the year ending Sept. 30, 1915.

[Made by J. T. Hartson.]

Date.	Gage height.	Discharge.	Date.	Gage height.	Discharge.
	Feet.	*Sec.-ft.*		*Feet.*	*Sec.-ft.*
Jan. 30	4.68	513	June 2	6.98	3,360
Feb. 2	4.46	493	3	6.85	3,290

Daily discharge, in second-feet, of Methow River at Pateros, Wash., for the year ending Sept. 30, 1915.

Day.	Oct.	Nov.	Dec.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.
1	652	830	755	......	360	870	2,780	3,580	1,540	958	437
2	652	870	755	......	360	1,080	2,640	3,400	1,640	997	437
3	620	990	720	......	360	1,540	2,500	3,080	1,640	920	437
4	620	950	720	......	382	1,750	2,500	3,080	1,750	884	437
5	590	990	720	......	382	1,750	2,500	3,580	1,750	814	437
6	590	990	685	......	382	1,750	2,640	4,500	1,750	781	437
7	560	950	685	......	360	1,750	3,240	4,700	1,640	750	437
8	560	910	685	......	360	1,860	4,120	4,120	1,540	719	437
9	560	910	652	......	382	1,860	4,500	3,580	1,440	690	420
10	590	870	590	......	382	1,750	4,900	3,240	1,350	662	420
11	620	830	478	......	382	1,750	4,300	2,930	1,200	636	420
12	620	870	404	......	382	1,860	3,760	2,780	1,120	609	420
13	620	870	382	......	382	2,100	3,400	2,780	1,080	609	420
14	620	792	......	......	382	2,100	3,760	2,780	1,040	584	420
15	620	755	......	......	404	2,230	3,400	2,930	1,040	560	420
16	620	755	......	360	428	2,360	3,240	2,930	1,040	560	420
17	620	755	......	382	452	2,780	2,930	2,780	997	560	437
18	755	755	......	360	452	3,580	3,080	2,640	958	560	420
19	830	755	......	360	478	4,500	3,400	2,500	920	538	420
20	792	755	......	360	478	4,900	3,400	2,230	920	515	403
21	792	792	......	360	504	4,500	3,580	2,230	848	515	403
22	755	792	......	360	560	3,760	3,760	2,100	814	515	403
23	755	755	......	360	560	3,400	3,760	2,100	781	515	403
24	720	755	......	382	685	3,080	3,940	2,100	781	515	403
25	720	755	......	382	720	2,930	4,300	2,230	750	494	403
26	720	755	......	360	720	2,930	3,940	2,100	750	474	403
27	720	755	......	360	720	2,780	3,760	1,860	848	474	398
28	720	792	......	360	755	2,930	4,500	1,640	884	474	398
29	720	792	......	......	792	3,080	4,500	1,540	958	456	398
30	720	755	......	......	830	3,080	4,120	1,540	997	456	372
31	755	......	......	......	830	......	3,760	......	958	456	......

NOTE.—Discharge ascertained as follows: Oct. 1 to Apr. 20, from a rating curve well defined between 300 and 5,000 second-feet; Apr. 21 to Sept. 30 from a rating curve well defined between 350 and 8,000 second-feet. Discharge estimated, because of ice, from observer's notes and records of precipitation and temperature, Dec. 14-21, 370 second-feet; Dec. 22-31, 405 second-feet; Jan. 1-10, 435 second-feet; Jan. 11-20, 395 second-feet; Jan. 21-31, 380 second-feet; Feb. 1-10, 445 second-feet; Feb. 11-15, 365 second-feet.

Monthly discharge of Methow River at Pateros, Wash., for the year ending Sept. 30, 1915.

Month.	Discharge in second-feet.			Run-off (total in acre-feet).	Accuracy.
	Maximum.	Minimum.	Mean.		
October	830	560	671	41,300	A.
November	990	755	828	49,300	A.
December	755	....	492	30,300	B.
January	....	....	403	24,800	C.
February	....	....	394	21,900	C.
March	830	360	503	30,900	A.
April	4,900	870	2,550	152,000	A.
May	4,900	2,500	3,580	220,000	A.
June	4,700	1,540	2,790	166,000	A.
July	1,750	750	1,150	70,700	A.
August	997	456	621	38,200	A.
September	437	372	416	24,800	A.
The year	4,900	....	1,200	870,000	

STEHEKIN RIVER AT STEHEKIN, WASH.

LOCATION.—In the SW. ¼ sec. 26, T. 33 N., R. 17 E., one-fourth mile below Boulder Creek, a mile above Stehekin, in Chelan County, and 1¼ miles above Lake Chelan.

DRAINAGE AREA.—368 square miles (measured on Chelan National Forest and topographic maps).

Records available.—December 6, 1910, to October 31, 1915, when station was discontinued.

Gage.—Inclined and vertical staff on left bank one-fourth mile below Boulder Creek; read to hundredths once daily by Mrs. F. W. Merritt. Prior to August 19, 1911, the station was at the pipe-line trestle of Hotel Field at Stehekin.

Discharge measurements.—Made from cable 50 feet below gage or by wading.

Channel and control.—Bed composed of small boulders; practically permanent. Banks low and subject to overflow at extremely high stages. Zero flow would occur at gage height −1.2 feet ±0.2 foot, as determined September 17, 1914.

Extremes of discharge.—Maximum stage recorded during year, 3.82 feet at 5 p. m. May 9 (discharge, 3,350 second-feet); minimum discharge estimated at 154 second-feet January 28, during ice season.

1910–1915: Maximum stage recorded, 6.0 feet June 12, 1911 (discharge, 11,400 second-feet); minimum discharge estimated at 150 second-feet March 10, 1911, from gage reading of doubtful accuracy and observer's statement that river fell to a very low stage.

Winter flow.—Stage-discharge relation seriously affected by ice; flow estimated from observer's notes and records of precipitation and temperature.

Accuracy.—Stage-discharge relation permanent, affected by ice for short periods. Results excellent except during ice season.

Discharge measurements of Stehekin River at Stehekin, Wash., during 1910–1915.

Date.	Made by—	Gage height.	Discharge.	Date.	Made by—	Gage height.	Discharge.
1910.		*Feet.*	*Sec.-ft.*	1913.		*Feet.*	*Sec.-ft.*
Dec. 7	F. C. Ebert	[a] 1.00	665	Sept. 26	F. B. Storey	1.10	538
1911.				1914.			
Aug. 15	G. L. Parker	1.75	1,010	July 4	C. O. Brown	4.29	4,090
Sept. 28	R. C. Pierce	.93	446	4	do	4.18	3,960
				Sept. 17	do	.86	416
1912.							
Feb. 7	W. W. Clifford	.42	205	1915.			
June 4	R. C. Pierce	3.57	2,900	June 5	J. T. Hartson	3.03	2,270
5	do	3.93	3,540	6	do	3.30	2,680
Sept. 19	G. L. Parker	1.01	462	Oct. 9	do	.57	260

[a] Original gage.

Note.—Gage heights of measurements have been corrected to datum, on basis of levels, since previously published.

Daily discharge, in second-feet, of Stehekin River at Stehekin, Wash., from May 1, 1914, to Oct. 31, 1915.

Day.	May.	June.	July.	Aug.	Sept.	Day.	May.	June.	July.	Aug.	Sept.
1914.						1914.					
1	2,480	4,280	4,640	1,600	782	16	3,680	6,020	2,510	1,130	398
2	4,110	6,230	4,280	1,500	782	17	3,790	6,020	2,510	1,050	398
3	3,870	5,420	5,020	1,500	770	18	3,900	5,220	2,640	1,010	640
4	3,630	3,620	3,940	1,500	757	19	4,000	4,110	2,770	1,050	745
5	3,380	3,470	3,180	1,600	745	20	4,110	3,470	2,270	1,220	640
6	3,140	3,040	3,040	1,400	710	21	4,830	2,770	1,600	1,220	540
7	2,900	3,470	2,770	1,220	782	22	4,830	2,270	1,500	1,010	605
8	2,770	3,320	3,180	1,010	605	23	5,620	2,030	1,600	1,010	605
9	2,770	3,040	3,040	1,050	510	24	5,220	2,030	1,600	1,010	675
10	3,040	3,320	2,770	1,220	572	25	4,110	2,270	1,600	1,010	745
11	3,150	3,040	3,040	1,310	540	26	3,320	2,270	1,500	1,010	1,220
12	3,250	3,470	3,180	1,400	452	27	2,770	2,510	1,500	970	782
13	3,360	3,470	3,180	1,310	425	28	2,510	2,640	1,400	1,050	640
14	3,470	4,110	2,900	1,400	398	29	2,510	3,040	1,400	1,010	572
15	3,580	5,020	2,770	1,400	398	30	2,510	3,940	1,400	932	640
						31	3,3[illegible]	......	1,600	782	......

Daily discharge, in second-feet, of Stehekin River at Stehekin, Wash., from May 1, 1914, to Oct. 31, 1915—Continued.

Day.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.
1914-15.													
1	572	1,220	782	311	....	194	1,220	1,600	1,500	1,700	1,220	1,050	510
2	540	1,220	782	306	....	197	3,040	1,500	1,500	1,920	1,310	1,050	452
3	480	1,310	745	302	....	204	3,040	1,500	1,500	1,920	1,400	970	398
4	452	1,400	710	275	194	200	2,390	1,600	1,700	2,030	1,400	782	311
5	425	1,310	675	271	194	210	2,270	1,810	2,270	2,030	1,260	675	425
6	398	1,130	640	271	204	210	2,150	2,270	2,640	1,810	1,130	540	298
7	398	1,010	640	271	204	214	1,700	3,040	2,640	1,500	1,050	540	271
8	370	895	572	267	204	218	1,920	3,040	2,030	1,600	1,050	572	263
9	452	895	572	263	204	228	1,700	3,320	1,920	1,400	1,050	540	255
10	510	858	510	267	204	232	1,810	2,900	1,700	1,130	1,050	480	232
11	425	1,050	480	267	197	239	1,920	2,150	1,600	970	1,050	452	221
12	480	932	425	247	194	243	1,920	1,810	1,400	1,050	1,050	398	263
13	510	895	398	251	188	251	2,030	1,810	1,600	970	1,050	370	283
14	540	858	....	235	176	316	1,810	1,810	1,700	1,050	1,050	320	294
15	510	782	....	232	188	345	2,030	1,600	1,810	858	1,130	370	296
16	760	782	....	232	188	510	2,150	1,400	2,030	858	1,310	370	296
17	1,010	710	....	232	188	452	2,770	1,500	1,700	932	1,400	370	297
18	895	675	....	232	182	452	3,040	1,810	1,500	895	1,220	425	298
19	895	710	....	218	179	480	3,040	1,700	1,310	858	1,310	398	298
20	745	932	....	200	176	510	2,770	1,810	1,310	1,050	1,220	425	298
21	640	895	....	200	179	572	2,510	1,700	1,310	1,050	1,500	398	306
22	605	858	....	188	182	710	2,150	1,700	1,400	1,070	1,600	425	345
23	605	820	....	179	188	1,010	2,030	1,600	1,600	1,090	1,500	398	306
24	572	782	....	162	194	1,050	1,810	1,600	1,810	1,110	1,500	398	958
25	540	782	....	162	197	970	1,700	1,600	1,700	1,130	1,130	398	820
26	540	1,050	....	....	194	895	1,810	1,500	1,600	1,220	1,130	370	970
27	540	932	....	....	194	858	1,810	1,810	1,500	1,130	1,220	345	745
28	572	932	311	....	194	858	1,810	2,270	1,400	1,220	1,400	320	782
29	572	895	311	....	....	895	2,030	1,700	1,310	1,220	1,400	311	782
30	895	858	311	....	....	895	1,810	1,600	1,400	1,400	1,220	311	710
31	820	....	311	....	....	858	....	1,600	....	1,310	1,130	.....	710

NOTE.—Discharge May 1 to Sept. 30, 1914, revised as values published in Water-Supply Paper 392 were based on incorrect assumption that gage had been disturbed. Discharge ascertained from rating curve well defined between 150 and 5,000 second-feet. May 3-6, 11-19, Aug. 24, Sept. 3, 4, 24, Oct. 16, 1914; Feb. 7, 8, July 22-24, and Aug. 5 and 12, 1915, gage not read; discharge interpolated. Discharge estimated from observer's notes and records of precipitation and temperature, Dec. 14-18, 385 second-feet; Dec. 19-23, 350 second-feet; Dec. 24-27, 325 second-feet; Jan. 26-31, 160 second-feet; Feb. 1-3, 180 second-feet.

Monthly discharge of Stehekin River at Stehekin, Wash., for the period May 1, 1914, to Oct. 31, 1915.

[Drainage area, 368 square miles.]

Month.	Discharge in second-feet.				Run-off.		Accuracy.
	Maximum.	Minimum.	Mean.	Per square mile.	Depth in inches on drainage area.	Total in acre-feet.	
1914.							
May	5,620	2,480	3,550	9.65	11.12	218,000	A.
June	6,230	2,030	3,630	9.86	11.00	216,000	A.
July	5,020	1,400	2,590	7.04	8.12	159,000	A.
August	1,600	782	1,190	3.23	3.72	73,200	A.
September	1,220	398	636	1.73	1.93	37,800	A.
The period	....	....	....	....	....	704,000	
1914-15.							
October	1,010	370	589	1.60	1.84	36,200	A.
November	1,400	675	946	2.57	2.87	56,300	A.
December	782	....	456	1.24	1.43	28,000	C.
January	311	....	226	.614	.71	13,900	B.
February	204	....	190	.516	.54	10,600	B.
March	1,050	194	499	1.36	1.57	30,700	A.
April	3,040	1,220	2,140	5.82	6.49	127,000	A.
May	3,320	1,400	1,890	5.14	5.93	116,000	A.
June	2,640	1,310	1,680	4.57	5.10	100,000	A.
July	2,030	858	1,270	3.45	3.98	78,100	A.
August	1,600	1,050	1,240	3.37	3.88	76,200	A.
September	1,050	311	492	1.34	1.50	29,300	A.
The year	3,320	....	971	2.64	35.84	702,000	
1915.							
October	970	221	433	1.18	1.36	26,600	A.

LAKE CHELAN AT CHELAN, WASH.

Location.—In sec. 13, T. 27 N., R. 22 E., at Forest Service boat landing at Chelan, in Chelan County, a quarter of a mile above highway bridge at outlet.

Drainage area.—951 square miles.

Records available.—September 1 to October 15, 1897; January 1, 1898, to December 31, 1899; January 1 to June 30, 1905; December 5, 1910, to September 30, 1915.

Gage.—Vertical staff on pile at landing installed December 5, 1910; datum 1,076.15 feet above sea level. 1897–1899, gage was at Lakeside, about 1 mile west of Chelan; datum 1,070.18 feet above sea level. In 1905 gage was on a bent of the upper bridge at Chelan; elevation of datum not determined. Observers, H. M. White, O. F. Ericson, and W. E. Naylor.

Extremes of stage.—Maximum stage recorded during year, 3.8 feet at 8.30 a. m. November 9, 16, and April 4; minimum stage recorded, 2.85 feet at 8.30 a. m. February 15.

1898–99 and 1911–1915: Maximum stage recorded, 6.70 feet at 9 a. m. June 9, 1913; minimum stage recorded, 6.60 feet January 27–28, and December 2–5, 1898.

Regulation.—The height of water in the lake is controlled by operation of gates in the dam at outlet.

Cooperation.—Gage-height record since December, 1910, furnished by United States Forest Service.

Daily gage-height, in feet, of Lake Chelan at Chelan, Wash., for the year ending Sept. 30, 1915.

Day.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.
1					3.14	2.94						
2		3.68									3.22	
3								3.10				
4				3.33			3.80					
5	3.40		3.75		2.94					3.48		
6												
7									3.22			3.13
8					3.20	3.00						
9		3.80									3.25	
10								3.40				
11				3.18								
12	3.30		3.60				3.45			3.23		
13												2.90
14									3.25			
15					2.85	3.00						
16		3.80									3.23	
17								3.28				
18				3.05								
19	3.50		3.45				3.50			2.92		
20												2.22
21									3.32			
22					2.90	3.10						
23		3.78									3.30	
24								3.15				
25				2.95								
26	3.45						3.45			3.03		
27												2.95
28			3.32						3.22			
29						3.50						
30		3.70									3.46	
31								3.10				

CHELAN RIVER AT CHELAN, WASH.

Location.—In sec. 13, T. 27 N., R. 22 E., at lower highway bridge in town of Chelan, 800 feet below the flashboard dam at the outlet of Chelan Lake, and 4 miles northwest of Chelan Falls, in Chelan County.

Records available.—November 6, 1903, to September 30, 1915.

Drainage area.—951 square miles (measured on topographic maps).

Gage.—Vertical staff gage; read once daily to hundredths October 1 to December 3 and December 22 to March 20, by H. M. White; December 4–21 and March 21 to May 4, by O. F. Ericson; May 5 to September 30, by W. E. Naylor. Gage is attached to fourth bent of left approach to lower highway bridge.

Discharge measurements.—Made from upper highway bridge about 1,000 feet above gage or by wading at low stages.

Channel and control.—Control, approximately 200 feet below the gage, is well defined and consists of boulders and gravel, likely to shift. Banks high and not subject to overflow. Channel sharply curved 100 feet above gage but practically straight for some distance below.

Extremes of discharge.—Maximum stage recorded during year, 8.05 feet at 8.30 a. m. April 7 (discharge, 3,980 second-feet); minimum stage recorded, 4.50 feet February 5, 12, 17, 18, and 20–24 (discharge, 403 second-feet).

1903–1915: Maximum stage recorded, 10.7 feet May 14, 1910 (discharge, 8,350 second-feet, revised value); minimum stage recorded, 4.35 feet December 17, 1910 (discharge, 245 second-feet).

Winter flow.—Stage-discharge relation not affected by ice.

Diversions.—Several ditches divert a very small percentage of the run-off for irrigation from tributaries of Chelan Lake.

Regulation.—A flashboard dam 800 feet above the gage controls the lake level at low water for navigation.

Accuracy.—No diurnal fluctuation; results considered excellent except for short periods when repairs or adjustments to flashboard dam cause unnatural fluctuation.

Cooperation.—Gage-height record furnished by United States Forest Service.

Discharge measurements of Chelan River at Chelan, Wash., during the year ending Sept. 30, 1915.

Date.	Made by—	Gage height.	Discharge.	Date.	Made by—	Gage height.	Discharge.
		Feet.	*Sec.-ft.*			*Feet.*	*Sec.-ft.*
Feb. 4	J. T. Hartson	4.68	422	June 3	J. T. Hartson	7.33	2,930
4	.....do	4.55	389	Aug. 19	C. O. Brown	6.20	1,540

Daily discharge, in second-feet, of Chelan River at Chelan, Wash., for the year ending Sept. 30, 1915.

Day.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.
1	818	1,040	1,160	648	482	433	1,360	3,280	2,990	2,330	1,440	1,580
2	818	1,160	1,160	624	465	433	1,470	3,280	2,990	2,330	1,470	1,470
3	786	1,160	1,210	613	433	433	2,460	3,280	2,850	2,330	1,470	727
4	786	1,260	1,160	602	403	433	2,870	3,280	2,850	2,400	1,470	727
5	786	1,160	1,210	558	403	433	3,280	3,130	2,720	2,460	1,470	727
6	727	1,310	1,180	602	465	433	3,900	3,130	2,860	2,460	1,470	727
7	727	1,260	1,160	579	442	433	3,900	3,130	2,990	2,460	1,580	727
8	700	1,360	1,160	648	418	433	3,900	3,280	3,130	2,460	1,520	727
9	673	1,360	1,120	602	433	433	3,740	3,580	3,130	2,460	1,470	727
10	700	1,360	1,070	580	433	433	3,580	3,580	3,130	2,460	1,470	624
11	714	1,420	1,120	558	418	433	3,500	3,580	2,990	2,400	1,470	500
12	727	1,420	990	624	403	433	3,430	3,580	2,720	2,330	1,580	482
13	727	1,470	920	579	433	449	3,580	3,740	2,720	2,200	1,580	465
14	727	1,360	850	624	433	457	3,430	3,740	2,720	2,200	1,470	465
15	727	1,310	885	602	433	465	3,360	3,580	2,460	2,070	1,470	465
16	700	1,260	850	538	433	465	3,280	3,580	2,460	1,940	1,470	465
17	756	1,260	786	528	403	500	3,290	3,430	2,460	1,820	1,580	449
18	803	1,260	786	519	403	482	3,430	3,280	2,330	1,760	1,580	465
19	850	1,260	850	519	403	500	3,580	3,280	2,330	1,700	1,470	465
20	786	1,260	850	500	403	482	3,900	3,280	2,330	1,700	1,260	465
21	850	1,160	850	500	403	520	3,740	3,280	2,330	1,580	1,310	465
22	850	1,160	727	465	403	558	3,900	3,280	2,330	1,260	1,340	465
23	885	1,160	648	465	403	602	3,740	3,280	2,330	1,260	1,360	465
24	850	1,260	673	465	403	700	3,740	3,280	2,460	1,210	1,420	449
25	834	1,160	700	465	418	727	3,820	3,280	2,460	1,240	1,470	465
26	818	1,160	727	433	418	786	3,900	3,130	2,460	1,260	1,700	482
27	818	1,210	664	418	433	818	3,580	3,130	2,400	1,260	1,700	500
28	818	1,260	602	418	433	834	3,580	3,280	2,330	1,360	1,700	449
29	818	1,210	602	433	....	850	3,580	3,280	2,330	1,360	1,760	433
30	786	1,160	648	433	....	1,260	3,580	3,140	2,330	1,420	1,820	418
31	920	....	673	458	....	1,310	....	2,990	....	1,420	1,700	....

Note.—Discharge ascertained from rating curve well defined between 350 and 9,000 second-feet. Gage not read on Sunday; discharge interpolated. Discharge values subject to some uncertainty for the following days: Mar. 29, Apr. 3, 5, and Aug. 25, when flashboards were removed for dam; June 20, Aug. 2, and Sept. 3, when flashboards were inserted in dam; Aug. 10, when a portion of dam went out; Aug. 19 to Sept. 2, when the dam was repaired.

Monthly discharge of Chelan River at Chelan, Wash., for the year ending Sept. 30, 1915.

Month.	Discharge in second-feet.			Run-off (total in acre-feet).	Accuracy.
	Maximum.	Minimum.	Mean.		
October	920	673	783	48,100	A.
November	1,470	1,040	1,250	74,400	A.
December	1,210	602	903	55,500	A.
January	648	418	535	32,900	A.
February	482	403	423	23,500	A.
March	1,310	433	579	35,600	A.
April	3,900	1,360	3,410	203,000	A.
May	3,740	2,990	3,330	205,000	A.
June	3,130	2,330	2,630	156,000	A.
July	2,460	1,210	1,900	117,000	A.
August	1,820	1,260	1,520	93,500	B.
September	1,580	418	601	35,800	A.
The year	3,900	403	1,490	1,080,000	

ENTIAT RIVER AT ENTIAT, WASH.

LOCATION.—In sec. 18, T. 25 N., R. 21 E., one-eighth mile below power house of the Wenatchee Valley Gas & Electric Co., threee-fourths mile above Entiat, in Chelan County, and about a mile above mouth.

DRAINAGE AREA.—419 square miles (measured on topographic map).

RECORDS AVAILABLE.—October 5, 1910, to September 30, 1915.

GAGE.—Inclined staff on left bank one-eighth mile below power house, read once daily to hundredths by L. C. Asher.

DISCHARGE MEASUREMENTS.—Made from private bridge 200 feet below power house or by wading.

CHANNEL AND CONTROL.—Gravel and bowlders, shifting during extremely high water. One channel at all stages. Left bank high, not subject to overflow. Right bank slopes gradually.

EXTREMES OF DISCHARGE.—Maximum stage recorded during year, 3.00 feet at 5 p. m. April 20, and at 11 a. m. May 10 (discharge, 1,510 second-feet); minimum stage recorded, 0.78 foot September 28–30 (discharge, 83 second-feet).

1910–1915: Maximum stage recorded, 4.4 feet June 3–4, 1913 (discharge, 3,800 second-feet); minimum flow estimated at 65 second-feet February 7, 1914, from temperature record and observer's notes during period when stage-discharge relation was affected by ice.

WINTER FLOW.—Stage-discharge relation seriously affected by ice; flow estimated from observer's notes, discharge measurements, and records of precipitation and temperature.

DIVERSIONS.—Entiat Irrigation Co.'s high-line canal (capacity about 20 second-feet) diverts above the gage.

REGULATION.—Flow affected somewhat by changes in load when the power plant is in operation.

ACCURACY.—Results good except during winter season. Some diurnal fluctuation at extremely low water.

COOPERATION.—Gage-height record furnished by Wenatchee Valley Gas & Electric Co.

Discharge measurements of Entiat River at Entiat, Wash., during the yaer ending Sept, 30, 1915.

[Made by J. T. Hartson.]

Date.	Gage height.	Discharge.	Date.	Gage height.	Discharge.
	Feet.	*Sec.-ft.*		*Feet.*	*Sec.-ft.*
Jan. 26	3.24	106	Feb. 6	1.00	129
Feb. 5	1.02	126	June 7	2.64	1,070

Daily discharge, in second-feet, of Entiat River at Entiat, Wash., for the year ending Sept. 30,1915.

Day.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.
1	158	215	246	144	108	112	250	915	915	360	246	142
2	158	268	260	146	112	120	446	915	915	388	238	120
3	154	250	246	151	116	128	740	870	870	415	231	116
4	154	242	238	148	114	133	660	870	825	545	235	112
5	156	238	231	146	112	133	582	825	870	511	225	112
6	158	261	225	141	112	135	620	780	960	511	196	100
7	158	264	228	137	112	135	620	825	1,110	388	188	108
8	158	261	212	137	114	128	620	870	1,110	336	185	104
9	156	253	196	132	114	128	620	1,160	1,110	311	185	106
10	146	246	168	134	112	128	582	1,510	1,110	302	179	104
11	185	242	134	134	112	128	582	1,450	915	285	171	102
12	161	246	132	134	108	131	700	1,270	620	246	171	100
13	158	238	......	134	108	131	740	1,110	620	238	158	102
14	158	231	......	134	104	133	740	1,010	620	225	156	97
15	154	205	......	......	108	156	740	960	620	218	156	95
16	156	212	......	......	104	158	870	915	620	199	151	93
17	166	218	......	......	108	166	960	915	660	196	154	90
18	179	231	......	......	110	171	1,220	870	660	185	154	90
19	199	228	......	......	108	171	1,390	870	660	179	156	88
20	199	231	......	......	104	185	1,510	915	660	179	154	90
21	185	238	......	......	106	193	1,390	915	545	182	148	90
22	185	250	......	......	108	215	1,270	915	511	185	151	90
23	179	231	......	......	110	231	1,160	915	511	188	148	90
24	179	235	......	......	124	311	960	960	545	185	148	90
25	171	231	......	......	120	290	915	960	545	179	148	88
26	158	231	......	......	116	250	870	870	446	182	128	88
27	158	235	......	......	116	253	870	870	446	185	128	85
28	158	242	......	......	114	250	870	960	415	257	124	83
29	158	250	......	......	......	253	870	1,060	360	261	128	83
30	171	246	......	......	......	253	825	1,060	360	257	133	83
31	199	......	......	......	......	253	......	1,060	......	250	133	......

NOTE.—Discharge ascertained from well-defined rating curves. Discharge estimated, because of ice, from observer's notes, records of precipitation and temperature, and one discharge measurement, Dec. 13–31, 130 second-feet; Jan. 1-2, and 4–5, as in table; Jan. 15–22, 125 second-feet; Jan. 23–31, 110 second-feet; Feb. 1–2, and 17, as in table.

Monthly discharge of Entiat River at Entiat, Wash., for the year ending Sept. 30, 1915.

Month.	Discharge in second-feet.			Run-off (total in acre-feet).	Accuracy.
	Maximum.	Minimum.	Mean.		
October	199	146	167	10,300	B.
November	268	205	239	14,200	B.
December	250	....	161	9,900	D.
January	151	....	127	7,810	D.
February	124	104	111	6,160	B.
March	311	112	179	11,000	B.
April	1,510	250	840	50,000	B.
May	1,510	780	980	60,300	B.
June	1,110	360	704	41,900	B.
July	545	179	275	16,900	B.
August	246	124	168	10,300	B.
September	142	83	98.0	5,830	B.
The year	1,510	83	338	245,000	

WENATCHEE RIVER NEAR LEAVENWORTH, WASH.

LOCATION.—In the SW. ¼ sec. 12, T. 26 N., R. 17 E., below county highway bridge, half a mile below Beaver Creek. and about 14 miles north of Leavenworth, in Chelan County.

DRAINAGE AREA.—591 square miles (measured on topographic maps).

RECORDS AVAILABLE.—November 28, 1910, to September 30, 1915.

GAGE.—Since September 6, 1913, inclined and vertical staff on left bank a quarter of a mile below county highway bridge; read once a day to hundredths by Robert E. Nickles. From November 28, 1910, to September 5, 1913, a vertical staff 15 feet downstream at same datum.

DISCHARGE MEASUREMENTS.—Made from cable three-eighths of a mile above gage.

CHANNEL AND CONTROL.—Stream bed composed of gravel and small boulders, likely to shift during extreme floods. One channel at all stages; banks high and not subject to overflow. Zero flow would occur at gage height 1.5 feet ± 0.2 foot, as determined February 8 and October 3, 1915.

EXTREMES OF DISCHARGE.—Maximum stage recorded during year, 6.6 feet at 7.30 a. m. April 3 (discharge, 6,020 second-feet); minimum stage recorded, 2.58 feet at 12 m. September 29 (discharge, 316 second-feet).

1910–1915: Maximum stage recorded, 9.6 feet at 6 p. m. June 3 and at 8 a. m. and 6 p. m. June 4, 1913 (discharge, 14,500 second-feet); minimum stage recorded, September 29, 1915.

WINTER FLOW.—Stage-discharge relation seriously affected by ice December 17–30 and February 13–15; flow estimated from observer's notes and records of precipitation and temperature.

DIVERSIONS.—The Wenatchee Park Land & Irrigation Co. diverted a maximum of approximately 10 second-feet from Chiwawa Creek for short periods during irrigation season.

REGULATION.—None. Natural storage in Lake Wenatchee 8 miles above gage.

ACCURACY.—Results excellent for periods of open channel. Practically no diurnal fluctuation.

COOPERATION.—Gage-height record furnished by Quincy Valley Irrigation District.

Discharge measurements of Wenatchee River near Leavenworth, Wash., during the year ending Sept. 30, 1915.

[Made by J. T. Hartson.]

Date.	Gage height.	Discharge.
	Feet.	*Sec.-ft.*
Feb. 8	2.78	441
June 10	4.38	2,050

Daily discharge, in second-feet, of Wenatchee River near Leavenworth, Wash., for the year ending Sept. 30, 1915.

Day.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.
1	745	2,270	1,640	658	460	432	2,140	2,540	2,270	1,400	930	575
2	745	2,400	1,520	658	460	429	4,140	2,400	2,140	1,520	930	528
3	745	3,610	1,460	615	460	426	6,020	2,400	2,010	1,640	882	520
4	700	3,610	1,400	615	460	460	5,540	2,400	2,010	1,640	835	535
5	745	3,610	1,340	575	460	460	4,900	2,400	2,400	1,640	790	575
6	680	3,280	1,290	575	456	460	4,140	2,540	2,820	1,640	790	514
7	615	2,680	1,240	575	453	460	4,140	3,120	2,970	1,460	790	453
8	575	2,540	1,180	575	446	460	3,780	3,610	2,680	1,290	790	419
9	575	2,340	1,080	555	439	468	3,280	3,780	2,270	1,240	745	419
10	615	2,140	930	535	432	479	3,120	3,960	2,140	1,180	745	405
11	745	2,140	880	535	426	490	2,970	3,460	1,880	980	745	385
12	745	2,400	790	535	412	498	3,070	2,970	1,760	930	745	366
13	835	2,270	745	535	432	512	3,180	2,680	1,760	835	745	347
14	835	2,140	790	535	432	575	3,280	2,680	1,880	835	745	328
15	835	1,880	790	520	412	930	3,280	2,270	2,010	790	745	328
16	858	1,760	700	498	398	1,080	3,280	2,270	2,140	790	790	328
17	880	1,640	658	482	412	1,030	3,780	2,140	1,880	790	745	353
18	1,180	1,520	615	439	412	1,080	4,320	2,270	1,880	745	745	341
19	1,520	2,680	658	419	412	1,080	4,700	2,400	1,640	745	745	385
20	1,520	1,640	615	419	412	1,080	4,900	2,270	1,460	790	745	372
21	1,400	2,010	615	391	412	1,180	3,960	2,270	1,460	835	745	378
22	1,290	1,880	658	419	426	1.340	3,780	2,270	1,520	930	790	378
23	1,180	1,760	658	426	419	1,760	3,280	2,270	1,580	880	790	398
24	1,130	1,640	700	412	419	1,880	2,970	2,200	1,640	880	790	391
25	1,080	1,640	700	391	426	2,010	2,820	2,140	1,520	880	768	360
26	1,080	1,880	700	372	426	1,880	2,820	2,140	1,340	880	745	360
27	1,030	2,010	658	360	422	1,760	2,680	2,270	1,180	930	702	347
28	1,030	2,010	658	353	419	1,760	2,820	2,970	1,130	930	658	322
29	980	1,880	700	372	......	1,760	2,970	2,970	1,180	930	658	316
30	1,080	1,460	658	412	......	1,880	2,820	2,540	1,290	880	658	316
31	1,460	......	658	460	......	1,760	......	2,400	......	880	658	......

NOTE.—Discharge ascertained from well-defined rating curve. Discharge estimated, because of ice, from observer's notes and records of precipitation and temperature, Jan. 17–30 and Feb. 13–15. Gage not read; discharge interpolated as follows: Oct. 6, 16, 21; Nov. 4, 9, 13; Jan. 9, 13; Feb. 4, 6, 18, 27; Mar. 2, 10, 24; Apr. 12, 13, 28; May 11, 21, 24; June 23; July 1, 7; Aug. 3, 25, 27; Sept. 6 and 13.

Monthly discharge of Wenatchee River near Leavenworth, Wash., for the year ending Sept. 30, 1915.

[Drainage area, 591 square miles.]

Month.	Discharge in second-feet.				Run-off.		Accuracy.
	Maximum.	Minimum.	Mean.	Per square mile.	Depth in inches on drainage area.	Total in acre-feet.	
October	1,520	575	949	1.61	1.86	58,400	A.
November	3,610	1,520	2,230	3.77	4.21	133,000	A.
December	1,640	615	893	1.51	1.74	54,900	A.
January	658	....	491	.831	.96	30,200	C.
February	460	398	431	.729	.76	23,900	B.
March	2,010	426	1,030	1.74	2.01	63,300	A.
April	6,020	2,140	3,630	6.14	6.85	216,000	A.
May	3,960	2,140	2,610	4.42	5.10	160,000	A.
June	2,970	1,130	1,860	3.15	3.51	111,000	A.
July	1,640	745	1,060	1.79	2.06	65,200	A.
August	930	658	764	1.29	1.49	47,000	A.
September	575	316	402	.680	.76	23,900	A.
The year	6,020	316	1,360	2.30	31.31	987,000	

WENATCHEE RIVER AT DRYDEN, WASH.

Location.—In the SW. ¼ sec. 26, T. 24 N., R. 18 E., at Wenatchee Valley Gas & Electric Co.'s hydroelectric plant, one-fourth mile north of Dryden, in Chelan County, a mile below intake of Wenatchee Valley canal, 2 miles below Peshastin Creek, and 4 miles above Cashmere.

Drainage area.—1,200 square miles (measured on topographic maps).

Records available.—April 29, 1909 to December 31, 1910 (gage heights only); October 1, 1911, to September 30, 1915. Records were obtained at Cashmere, July 26, 1904 to September 30, 1911.

Gage.—Vertical staff attached to log cribbing at upstream side of tailrace; read twice daily to hundredths by Percy Burrow.

Discharge measurements.—Made from highway bridge 3 miles below gage.

Channel and control.—Solid rock and bowlders, practically permanent. Left bank high; right bank slopes gradually and is moderately high. Channel curved above and below gage.

Extremes of discharge.—Maximum stage recorded during year, 5.2 feet at 6 p. m. April 3 (discharge, 9,880 second-feet); minimum stage recorded, −0.3 foot, September 14–16 (discharge, 470 second-feet). Stage may have been lower during September 17–30, when gage was not read.

1911 to 1915: Maximum stage recorded, 8.8 feet at 6 p. m. June 3, and at 6 a. m. June 4, 1913 (discharge, 24,100 second-feet); minimum stage recorded September 14–16, 1915.

Winter flow.—Stage-discharge relation usually not affected by ice.

Diversions.—The Wenatchee Valley canal is the most important diversion above this station. Records are kept on this canal and the results added to give total flow.

Regulation.—A small amount of storage in the mill pond at Leavenworth.

Accuracy.—Results prior to slide at power plant July 3, excellent; for July and August, good, as hydrographic comparison with Wenatchee River near Leavenworth shows practically no backwater from slide; for September, fair.

Cooperation.—Gage-height record furnished by Wenatchee Valley Gas & Electric Co.

Discharge measurements of Wenatchee River at Dryden, Wash., during the year ending Sept. 30, 1915.

Date.	Made by—	Gage height.	Discharge.
		Feet.	*Sec.-ft.*
Oct. 27	I. L. Collier	1.16	1,440
Feb. 7	I. T. Hartson	.32	704
June 8	.....do	2.98	4,120

Daily discharge, in second-feet, of Wenatchee River at Dryden, Wash., for the year ending Sept. 30, 1915.

Day.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.
1	975	2,190	2,110	940	710	760	2,710	3,760	3,380	1,850	1,020	760
2	975	3,060	2,110	940	660	710	6,430	3,570	3,200	2,110	1,020	760
3	1,050	5,480	1,980	880	710	760	9,200	3,380	3,030	2,110	1,110	660
4	975	5,020	1,850	880	760	820	8,560	3,380	3,030	2,250	1,020	620
5	1,220	5,020	1,850	880	760	660	7,440	3,570	3,760	2,110	1,020	710
6	780	4,800	1,730	880	760	710	6,430	3,760	4,150	2,110	940	660
7	840	3,760	1,610	880	710	710	6,190	4,800	4,580	1,980	940	660
8	840	3,200	1,610	880	710	760	5,710	5,480	4,150	1,850	880	660
9	840	3,030	1,500	880	710	820	5,250	5,950	3,380	1,610	880	580
10	840	2,870	1,400	820	710	880	4,580	6,190	2,870	1,500	820	580
11	975	2,710	1,200	820	660	820	4,580	5,250	2,710	1,400	760	580
12	1,050	3,380	1,020	820	660	880	5,250	4,580	2,400	1,200	880	580
13	1,130	3,570	1,020	820	660	1,110	5,250	3,950	2,250	1,200	880	500
14	1,220	2,870	1,020	820	660	1,020	5,020	3,760	2,400	1,200	880	470
15	1,220	2,400	1,110	820	660	1,200	4,800	3,380	2,550	1,110	880	470
16	1,220	2,250	1,020	760	660	1,610	5,020	3,200	2,710	1,020	880	470
17	1,300	2,110	940	760	660	1,610	5,710	3,380	2,710	1,020	940	....
18	1,600	1,980	940	760	660	1,610	6,930	3,380	2,550	1,020	1,020	....
19	1,820	1,850	940	760	710	1,610	7,180	3,380	2,110	880	940	....
20	1,940	2,250	940	660	660	1,610	7,440	3,380	1,980	880	1,200	....
21	1,820	2,870	940	660	660	1,730	6,430	3,380	1,850	940	940	....
22	1,710	2,550	940	660	710	1,850	5,480	3,380	1,850	1,110	940	....
23	1,600	2,400	940	620	820	2,400	5,020	3,200	1,980	1,110	1,020	....
24	1,500	2,400	1,020	660	710	3,030	4,360	3,200	2,110	1,110	1,020	....
25	1,560	2,250	1,020	660	760	3,380	4,150	3,200	1,980	1,200	940	....
26	1,400	2,400	1,020	660	760	2,710	4,150	3,080	1,980	1,020	940	....
27	1,400	2,710	1,020	660	710	2,250	4,150	3,080	1,610	1,020	880	....
28	1,400	2,710	940	760	760	2,400	3,950	4,800	1,200	1,020	880	....
29	1,400	2,400	940	880	....	2,550	4,360	4,580	1,500	1,110	820	....
30	1,500	2,400	940	760	....	2,550	4,150	3,960	1,610	1,110	760	....
31	1,820	....	940	760	....	2,550	....	3,570	....	1,020	820	....

NOTE.—Discharge ascertained from two well-defined rating curves applicable Oct. 1 to Nov. 3, and Nov. 4 to Sept. 16. Sept. 17–30, gage not read, as channel conditions were being changed while repairing damage to power plant caused by slide of July 3; discharge estimated by hydrographic comparison with Wenatchee River near Leavenworth at 510 second-feet.

Combined monthly discharge of Wenatchee River and Wenatchee Valley canal at Dryden, Wash., for the year ending Sept. 30, 1915.

Month.	Discharge (second-feet).					Combined run-off (total in acre-feet).	Accuracy.
	Combined.		River (mean).	Canal (mean).	Total (mean).		
	Maximum.	Minimum.					
October	1,980	824	1,290	36.2	1,330	81,800	A.
November	5,480	1,850	2,960	.0	2,960	176,000	A.
December	2,110	940	1,240	.0	1,240	76,200	A.
January	940	620	787	.0	787	48,400	A.
February	820	660	705	.0	705	39,200	A.
March	3,380	660	1,550	.0	1,550	95,300	A.
April	9,200	2,710	5,530	21.4	5,550	330,000	A.
May	6,300	3,150	3,900	113	4,010	247,000	A.
June	4,700	1,320	2,590	122	2,710	161,000	A.
July	2,250	1,010	1,360	104	1,460	89,800	B.
August	1,330	888	931	128	1,060	65,200	B.
September	888	....	562	102	664	39,500	C.
The year	9,200	....	1,950	52.5	2,000	1,450,000	

WENATCHEE VALLEY CANAL AT DRYDEN, WASH.

LOCATION.—In sec. 26, T. 24 N., R. 18 E., 1,300 feet below the Dryden power house, 1½ miles below the canal intake, and directly across the river from Dryden, in Chelan County.

RECORDS AVAILABLE.—Irrigation seasons since June 10, 1911.

GAGE.—Since April 29, 1915, an enameled gage section read twice a day to hundredths by ditch walker of the Wenatchee Valley Gas & Electric Co. Gage is attached to left side of flume 1,300 feet below the Dryden power house. From June 11, 1910, to April 28, 1915, a vertical staff, 300 feet above the present gage, attached to left side of flume.

DISCHARGE MEASUREMENTS.—Made from foot plank near gage.

CHANNEL AND CONTROL.—Control is a section of flume extending some distance below gage and is permanent until cross section or slope of flume is changed.

EXTREMES OF DISCHARGE.—Maximum stage recorded during year and period 1911-1915, 2.85 feet from 1 p. m. July 15 to July 17 (discharge, 131 second-feet). No flow in canal from 3 p. m. October 31 to 7.30 a. m. April 12.

REGULATION.—Discharge of canal is regulated by controlling waste gates above gage. Canal is dry during nonirrigating season.

ACCURACY.—Results excellent; control permanent; times of regulating controlling gates noted in gage-height record.

COOPERATION.—Gage-height record furnished by Wenatchee Valley Gas & Electric Co.

Discharged measurements of Wenatchee Valley canal at Dryden, Wash., during the year ending Sept. 30, 1915.

Date.	Made by—	Gage height.	Discharge.
		Feet.	*Sec.-ft.*
Oct. 27	I. L. Collier	1.20	23.7
June 9	J. T. Hartson	[a]2.65	118

[a] Refers to gage installed Apr. 29, 1915. Old gage read 2.95 feet.

Daily discharge, in second-feet, of Wenatchee Valley canal at Dryden, Wash., for the year ending Sept. 30, 1915.

Day.	Oct.	Apr.	May.	June.	July.	Aug.	Sept.
1	44		97	118	124	128	128
2	44		97	118	124	128	128
3	44		97	118	40	128	127
4	44		97	118	0	128	122
5	44		98	118	0	128	124
6	44		103	118	0	128	124
7	44		108	118	82	128	124
8	44		112	118	72	128	124
9	44		112	118	91	128	124
10	44		112	118	97	128	115
11	44		115	119	97	128	115
12	44	10	118	123	111	128	115
13	38	15	118	123	118	128	97
14	35	15	118	123	118	128	97
15	35	15	118	123	124	128	97
16	35	15	118	123	131	128	97
17	35	15	118	123	131	128	85
18	35	15	118	123	128	128	85
19	35	15	118	123	128	128	85
20	35	15	118	123	128	128	85
21	35	29	118	123	128	128	85
22	35	35	118	124	128	128	85
23	35	35	118	124	128	128	85
24	35	35	118	124	128	128	85
25	35	35	118	124	128	128	85
26	27	46	118	124	128	128	85
27	24	61	118	124	128	128	85
28	24	61	118	124	128	128	85
29	24	77	118	124	128	128	85
30	24	97	118	124	128	128	85
31	15		118		128	128	

NOTE.—Discharge ascertained as follows: Oct. 1 to Apr. 28, from rating curve well defined between 18 and 140 second-feet; Apr. 29 to Sept. 30, from rating curve well defined between 60 and 130 second-feet; Oct. 13, 26, and 31, Apr. 12, 21, 26, and 29, May 5, 6, 7, and 11, June 11 and 21, July 3, 7, 8, 9, 12, and 15, Sept. 3 and 4, by weighting discharge for change in gate openings.

Monthly discharge of Wenatchee Valley canal at Dryden, Wash., for the year ending Sept. 30, 1915.

Month.	Discharge in second-feet.			Run-off (total in acre-feet).	Accuracy.
	Maximum.	Minimum.	Mean.		
October	44	15	36.2	2,230	A.
April 12-30	97	10	33.7	1,270	A.
May	118	97	113	6,950	A.
June	124	118	122	7,260	A.
July	131	0	104	6,400	A.
August	128	128	128	7,870	A.
September	128	85	102	6,070	A.

KEECHELUS LAKE NEAR MARTIN, WASH.

LOCATION.—At outlet of lake, 1¼ miles northeast of Meadow Creek station on Chicago, Milwaukee & St. Paul Railway, 3½ miles northwest of Martin, in Kittitas County, 9½ miles northwest of Easton.

DRAINAGE AREA.—55 square miles (measured on topographic maps).

RECORDS AVAILABLE.—January 12, 1906, to September 30, 1915.

GAGE.—Vertical staff; site changed frequently during 1914 and 1915 to avoid interference due to construction of new dam; read to hundredths twice daily by employees of United States Reclamation Service. Since August 19, 1914, gages have been set to sea-level datum. Prior to that date zero of gages at same height as gate sill in temporary crib dam, elevation 2,457 feet.

Extremes of storage.—Maximum stage recorded during year, 2,455.76 October 20–21 (storage, 40,080 acre-feet); minimum stage recorded, 2,434.50 feet May 5 (storage, 11,970 acre-feet).

1906–1915: Maximum stage recorded, 2,471.38 feet November 23, 1909 (storage, referred to gate sill of new reservoir, 62,910 acre-feet); minimum stage, 2,434.50 feet May 5, 1915 (storage, 11,970 acre-feet).

Storage.—Capacity of new reservoir, 152,000 acre-feet; elevation gate sill and spillway crest 2,425 feet and 2,515 feet, respectively. Storage or release each month used for determining discharge, without storage, for gaging station below dam

Cooperation.—Computations of storage furnished by United States Reclamation Service.

Storage, in acre-feet, of Keechelus Lake near Martin, Wash., for the year ending Sept 30, 1915.

Day.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.
1	38,660	33,300	31,220	28,920	27,360	27,000	13,710	12,250	17,170	19,840	19,400	18,930
2	38,550	33,840	31,000	28,650	27,290	27,010	15,390	12,120	17,530	19,790	19,400	18,930
3	38,420	35,550	30,880	28,470	27,260	27,040	16,380	12,080	17,800	19,760	19,350	18,930
4	38,300	35,180	30,750	28,300	27,220	27,060	16,150	12,010	18,160	19,720	19,320	18,930
5	38,220	34,950	30,650	28,210	27,250	27,100	15,400	11,970	18,460	19,690	19,320	18,930
6	38,120	34,570	30,630	28,170	27,170	27,120	14,730	12,000	18,850	19,660	19,290	18,930
7	38,030	34,090	30,470	28,130	27,100	27,130	14,300	12,120	19,110	19,630	19,270	18,930
8	37,940	33,740	30,430	28,100	27,040	27,140	14,030	12,210	19,400	19,590	19,240	19,000
9	37,850	33,410	30,340	28,110	27,010	27,140	13,710	12,300	19,660	19,570	19,230	19,190
10	37,920	33,140	30,260	28,110	26,960	27,170	13,390	12,470	19,940	19,550	19,220	19,200
11	38,040	33,260	30,220	28,110	26,930	27,200	13,210	12,500	20,150	19,530	19,190	19,230
12	38,240	33,470	30,180	28,110	26,930	27,220	13,160	12,460	20,390	19,530	19,160	19,220
13	38,410	33,450	30,140	28,130	26,920	27,250	13,240	12,400	20,670	19,520	19,150	19,260
14	38,480	33,220	30,100	28,150	26,930	27.400	13,280	12,330	20,830	19,530	19,140	19,320
15	38,520	32,960	30,100	28,230	26,900	27,700	13,140	12,260	20,730	19,530	19,120	19,320
16	38,570	32,660	30,060	28,170	26,900	28,250	13,080	12,200	20,570	19,550	19,100	19,250
17	38,710	32,470	30,040	28,210	26,930	28,370	13,220	12,180	20,490	19,680	19,090	19,380
18	39,010	32,310	29,920	28,110	26,930	28,550	13,350	12,230	20,410	19,710	19,060	19,410
19	39,720	32,150	29,960	28,100	26,930	27,580	13,520	12,300	20,330	19,680	19,060	19,410
20	40,080	32,310	30,120	28,070	26,930	28,610	13,520	12,380	20,280	19,700	19,060	19,410
21	40,080	32,390	30,260	27,990	26,930	28,710	13,340	12,460	20,230	19,670	19,050	19,450
22	39,670	32,340	30,260	27,990	26,930	28,800	13,080	12,510	20,200	19,630	19,050	19,450
23	38,460	32,290	30,150	28,010	26,930	29,080	12,830	12,500	20,140	19,580	19,030	19,450
24	37,770	32,260	30,020	27,990	26,930	29,460	12,600	12,560	20,060	19,580	19,020	19,450
25	37,150	32,210	29,990	27,980	26,980	29,540	12,480	12,820	20,000	19,530	19,020	19,450
26	36,740	32,020	29,920	27,940	26,980	27,120	12,390	13,200	19,970	19,480	18,980	19,450
27	36,200	31,910	29,830	27,890	26,960	19,780	12,340	13,710	19,970	19,450	18,980	19,450
28	35,740	31,800	29,790	27,890	27,010	16,470	12,520	14,720	19,940	19,450	18,980	19,420
29	34,880	31,590	29,750	27,730	....	15,120	12,330	15,490	19,930	19,450	18,960	19,420
30	34,110	31,400	29,560	27,560	....	14,200	12,300	16,080	19,890	19,420	18,940	19,420
31	33,600	....	29,150	27,440	....	13,660	....	16,520	....	19,420	18,930	....

YAKIMA RIVER NEAR MARTIN, WASH.

Location.—Below dam at outlet of Keechelus Lake, 1½ miles east of Meadow Creek station on Chicago, Milwaukee & St. Paul Railway, 3½ miles northwest of Martin, in Kittitas County, and 9½ miles northwest of Easton.

Drainage area.—55 square miles (measured on topographic maps).

Records available.—October 18 to November 14, 1903; January 28, 1904, to September 30, 1915.

Gages.—Four vertical and one inclined staff used after September 11, 1914, all differing in datum and site from previous gage; frequent changes to avoid interference due to construction work for new dam. Only two gages at same site and datum. Stevens water-stage recorder in operation January 25 to March 26. Gage read to hundredths twice daily by employees of United States Reclamation Service. Gage in use October 18 to November 14, 1903. on right bank 800 feet below crib dam; January 28, 1904, to October 7, 1912, vertical staff on right bank, 75 feet above previous gage and at a datum 0.07 foot lower; previous gage heights corrected to new datum; October 8, 1912, to September 11, 1914, vertical staff on right bank anchored to bent of highway bridge at same site and datum as previous gage.

DISCHARGE MEASUREMENTS.—Made from cable 1¼ miles below dam or by wading.

CHANNEL AND CONTROL.—Gravel; shifts during floods; logs and brush lodging on riffle control below gage sometimes affect stage-discharge relation.

EXTREMES OF DISCHARGE.—Gage destroyed March 26, by washing out of temporary crib dam. Maximum discharge, 7,370 second-feet at 10.45 a. m. March 26, determined from hourly gage heights of lake surface and estimated natural inflow to lake; minimum stage recorded, 3.42 feet June 1 (discharge approximately, 1 second-foot).

1904–1915: Maximum discharge, 7,370 second-feet, at 10.45 a. m. March 26, 1915, determined as described above. Gates in Keechelus reservoir dam closed frequently, resulting in practically no flow.

WINTER FLOW.—Stage-discharge relation not affected by ice. Water from Keechelus reservoir above freezing temperature.

DIVERSIONS.—None.

REGULATION.—Flow partly controlled by storage and release of water at Keechelus reservoir. Monthly discharge, without storage, determined from records of stage at reservoir.

ACCURACY.—Results for April, May, and July, good; for remainder of year, fair.

COOPERATION.—Records of discharge and measurements furnished by United States Reclamation Service.

Discharge measurements of Yakima River near Martin, Wash., during the year ending Sept. 30, 1915.

Date.	Made by—	Gage height for gage in use.				Discharge.
		Oct. 1 to Dec. 7.	Dec. 8 to Mar. 25.	Mar. 29 to July 19.	July 20 to Sept. 30.	
		Feet.	*Feet.*	*Feet.*	*Feet.*	Sec.-ft.
Oct. 2	F. E. Moxley	1.70				165
6	Tuttle and Taylor	1.50				127
Nov. 5	Moxley and Van Mavern	3.72	4.72			964
13	F. E. Moxley	3.06	4.06			700
Jan. 11	Thomas and Ralston	[a] 1.10	1.91			112
Feb. 9	F. E. Moxley	[a] 1.06	1.87			89
Mar. 28	R. I. Thomas			7.44		1,560
29	....do			6.94		1,230
30	....do			6.49		879
Apr. 2	....do			7.12		1,350
5	F. E. Moxley			7.01		1,210
10	R. I. Thomas			6.01		611
13	F. E. Moxley			6.00		576
26	R. I. Thomas			5.46		391
May 3	Parker and Taylor			5.20		266
25	Thomas and Ray			4.40	2.01	72
June 16	F. E. Moxley			5.00	2.63	169
16	....do			5.00	2.63	169
18	R. I. Thomas			[b] 4.90	[a] 2.52	143
July 7	F. E. Moxley			4.50	[a] 2.11	82
Sept. 30	Moxley and Calland			4.04	1.64	80

[a] Gage height determined by curve of relation.

[b] Observer's gage height for 4 p. m. June 18.

Daily discharge, in second-feet, of Yakima River near Martin, Wash., for the year ending Sept. 30, 1915.

Day.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.
1	200	341	359	344	118	76	750	283	3	97	67	42
2	165	360	324	191	111	76	1,280	283	3	94	67	41
3	165	1,220	258	111	96	76	1,580	265	4	90	65	41
4	165	1,110	258	151	126	82	1,420	248	7	87	64	44
5	165	1,000	229	134	134	82	1,210	283	20	83	62	48
6	127	950	243	126	126	82	1,080	283	32	81	60	29
7	136	800	243	111	118	82	880	300	36	80	60	34
8	120	620	203	118	103	89	815	300	3	80	59	43
9	112	620	191	118	96	89	690	300	3	79	58	46
10	112	500	180	111	89	89	605	318	2	76	56	49
11	120	580	170	108	75	96	535	318	2	79	56	43
12	127	660	161	103	72	96	535	318	2	77	56	42
13	127	715	142	103	75	96	580	300	2	79	56	50
14	127	590	134	111	74	118	580	279	1	76	55	54
15	127	511	134	103	72	180	535	261	185	79	54	56
16	127	395	126	96	71	276	535	244	171	80	52	56
17	136	359	82	76	71	316	580	224	159	84	52	56
18	165	290	15	89	72	330	605	208	147	91	50	56
19	256	290	82	89	71	358	630	192	139	90	48	56
20	400	359	103	89	70	358	630	190	135	89	48	57
21	420	395	76	82	71	373	605	165	129	87	48	56
22	900	395	161	82	70	403	512	163	127	84	47	62
23	660	359	180	82	69	499	445	178	123	83	47	62
24	580	414	191	82	71	568	405	181	116	82	46	63
25	500	472	134	76	74	604	370	72	113	79	46	64
26	420	452	134	75	75	4,240	353	22	109	77	44	79
27	440	433	126	71	75	2,990	335	12	109	73	43	53
28	420	452	151	82	76	1,650	318	8	109	69	44	31
29	705	433	89	180	....	1,210	318	4	106	67	44	31
30	460	395	103	161	....	815	300	4	102	67	43	31
31	420	....	344	142	....	690	....	4	....	67	43	....

NOTE.—Discharge ascertained from six rating curves not well defined, applicable as follows: Oct. 1 to Nov. 12; Nov. 13 to Dec. 7: Dec. 8 to Mar. 25; Mar. 29 to May 12; June 15 to July 19; and July 20 to Sept. 30. Mar. 26–28, gages washed out, discharged determined by adding flow equivalent to released storage and estimated natural inflow to lake on these days. Flow equivalent to storage released was determined from hourly readings of lake gage during interval. Discharge May 13 to June 14, ascertained by method devised for shifting control.

Monthly discharge of Yakima River near Martin, Wash., for year ending Sept. 30, 1915.

[Drainage area, 55 square miles.]

Month.	Observed discharge (second-feet).			Run-off (total in acre-feet).			Discharge without storage (second-feet).		Run-off (depth in inches on drainage area).	Accuracy of observed discharge.
	Maximum.	Minimum.	Mean.	Observed.	Stored.	Without storage.	Mean.	Per square mile.		
October	900	112	294	18,100	− 5,290	12,800	208	3.78	4.36	C.
November	1,220	290	549	32,700	− 2,200	30,500	513	9.33	10.41	C.
December	359	15	172	10,600	− 2,250	8,350	136	2.47	2.85	C.
January	344	71	116	7,120	− 1,720	5,400	87.8	1.60	1.84	C.
February	134	69	86.5	4,800	− 425	4,380	78.9	1.43	1.49	C.
March	4,240	76	551	33,900	−13,400	20,500	333	6.05	6.98	C.
April	1,580	300	667	39,700	− 1,300	38,300	644	11.71	13.07	B.
May	318	4	200	12,300	+ 4,220	16,500	268	4.87	5.62	B.
June	185	1	73.3	4,360	+ 3,370	7,730	130	2.36	2.63	C.
July	97	67	80.8	4,970	− 468	4,500	73.2	1.33	1.53	B.
August	67	43	52.9	3,250	− 494	2,760	44.9	.82	.94	C.
September	79	29	49.2	2,930	+ 494	3,420	57.5	1.05	1.17	C.
The year	4,240	1	241	175,000	−19,500	155,000	214	3.89	52.89	

YAKIMA RIVER AT EASTON, WASH.

LOCATION.—In sec. 11, T. 20 N., R. 13 E., at highway bridge one-fourth mile northwest of Easton, in Kittitas County, 1½ miles below Kachess River.

DRAINAGE AREA.—184 square miles (measured on topographic maps).

RECORDS AVAILABLE.—May 12 to November 28, 1904; February 5, 1910, to October 9, 1915, when station was discontinued.

GAGE.—After October 12, 1914, a vertical and inclined staff on left bank 20 feet above highway bridge; read to hundredths once a day by H. Robertson, before March 1; H. B. Battenfield after March 1. From May 12 to November 28, 1904, a vertical staff on left bank 20 feet below highway bridge, datum in respect to present gage not known. February 5 to June 21, 1910, a vertical staff on right bank on center pile of support for bridge approach, at datum 0.98 foot higher than present gage. June 22, 1910, to July 28, 1914, a chain gage on upstream side of bridge, same datum as previous gage. July 29 to October 11, 1914, a vertical staff on left downstream caisson of bridge, same datum as previous two gages, but 0.98 foot higher than present gage.

DISCHARGE MEASUREMENTS.—Made from highway bridge or by wading.

CHANNEL AND CONTROL.—Gravel; shifts at high stages. Low-water control formed by gravel riffle 30 feet below bridge; high-water control formed by section of stream bed extending considerable distance downstream. One channel at all stages. Zero flow would occur at gage height of about 0.4 foot, as determined September 29, 1915.

EXTREMES OF DISCHARGE.—Maximum stage recorded October 1, 1914, to October 9, 1915, 7.18 feet at 7 p. m. March 26 (discharge, 7,280 second-feet); minimum discharge, 38 second-feet September 30, estimated from summation of flow for Yakima River near Martin, Wash., Kachess River near Easton, Wash., and Cabin Creek.

1904; 1910–1915: Maximum stage recorded on March 26, 1915; minimum flow estimated at 25 second-feet, September 22, 1913, when gates of Keechelus and Kachess reservoirs were closed.

WINTER FLOW.—Stage-discharge relation seriously affected by ice; flow determined from discharge measurements, observer's notes, and records of temperature at Kachess reservoir.

DIVERSIONS.—None.

REGULATION.—Flow partly regulated by storage and release of water at Keechelus and Kachess reservoirs. Monthly discharge, without storage, determined from records of stage at reservoirs.

ACCURACY.—Observer's record only fairly reliable. Results good prior to March flood, except when stage-discharge relation was affected by ice (January 19 to February 1), and excellent for remainder of year, except for extremely low water.

COOPERATION.—Records of discharge and measurements furnished by United States Reclamation Service.

Discharge measurements of Yakima River at Easton, Wash., from Oct. 1, 1914, to Oct. 9, 1915.

Date.	Made by—	Gage height.	Discharge.	Date.	Made by—	Gage height.	Discharge.
1914.		*Feet.*	*Sec.-ft.*	1915.		*Feet.*	*Sec.-ft.*
Oct. 2	F. E. Moxley	2.31	588	Apr. 14	F. E. Moxley	2.69	937
7	Taylor and Tuttle	1.37	146	May 4	Taylor and Parker	2.05	413
1915.				June 15	F. E. Moxley	2.32	602
Jan. 26	F. E. Moxley	[a]2.30	106	15	....do	1.91	341
Feb. 8	....do	1.50	124	July 2	....do	2.90	1,110
Mar 11	....do	1.57	156	6	....do	2.89	1,090
26	Paul Taylor	7.02	6,960	Sept. 29	Calland and Moxley	1.10	48
27	....do	5.35	4,000	Oct. 7	....do	1.49	151
Apr. 6	F. E. Moxley	3.37	1,550				

[a] Stage-discharge relation affected by ice.

Daily discharge, in second-feet, of Yakima River at Easton, Wash., from Oct. 1, 1914, to Oct. 9, 1915.

Day.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.
1	586	643	646	366	130	98	1,110	477	108	1,110	630	142	41
2	578	710	646	319	128	110	1,780	443	102	1,110	585	136	82
3	578	1,600	615	319	122	122	2,570	437	97	1,110	548	130	102
4	180	1,320	584	234	128	128	2,100	418	92	1,110	511	124	113
5	180	1,240	525	226	128	128	1,780	406	87	1,110	477	175	119
6	142	1,150	525	226	128	128	1,480	406	97	1,110	431	108	119
7	147	1,070	525	161	128	128	1,380	406	100	1,020	406	102	148
8	578	921	525	154	122	128	1,200	406	92	930	370	108	142
9	547	921	416	154	122	141	1,060	406	77	930	347	119	139
10	404	779	275	141	116	148	975	412	72	980	336	108	......
11	404	921	234	141	110	154	930	418	72	975	325	105	......
12	458	995	211	135	104	161	930	406	72	975	325	97	......
13	441	1,070	196	135	98	161	930	418	310	1,020	315	102	......
14	406	958	234	135	98	196	980	370	305	1,020	315	100	......
15	378	849	275	128	98	366	885	347	443	1,020	305	97	......
16	365	779	234	116	110	416	840	315	585	1,020	300	97	......
17	379	711	204	116	104	442	885	325	585	1,020	315	95	......
18	354	646	189	116	98	469	930	294	750	986	284	92	......
19	447	646	168	114	93	491	975	269	750	985	274	87	......
20	516	711	319	112	93	469	930	265	750	1,020	256	87	......
21	516	711	343	111	93	525	885	256	750	1,020	237	84	......
22	354	711	366	110	93	584	840	246	895	1,020	228	82	......
23	997	745	366	109	93	615	707	246	1,110	930	220	82	......
24	851	745	366	108	93	711	795	274	1,110	885	212	80	......
25	643	745	366	107	93	711	840	174	1,110	885	204	77	......
26	643	745	366	106	98	3,240	930	124	1,110	885	196	74	......
27	404	745	319	105	98	4,010	585	113	1,110	840	188	119	......
28	458	779	234	140	98	2,000	548	154	1,110	840	174	44	......
29	780	779	211	194	......	1,580	511	130	1,110	750	168	43	......
30	643	779	211	175	......	1,200	511	119	1,110	750	157	38	......
31	643	......	275	152	......	1,020	......	113	......	707	148	......	......

NOTE.—Discharge determined as follows: Oct. 1 to Nov. 3, 1914, and Nov. 4 to Mar. 25, 1915, from two rating curves, neither of which is well defined; Jan. 19 to Feb. 1, 1915, estimated, because of ice, from observer's notes, current-meter measurements, and records of temperature and precipitation; Mar. 26 to Oct. 9, 1915, from a well-defined rating curve. For record of daily discharge Sept. 20-30, 1914, published in Water-Supply Paper 392, page 145, the following figures (obtained by indirect method for shifting control) should be substituted:

	Sec.-ft.		*Sec.-ft.*		*Sec.-ft.*		*Sec.-ft.*
Sept. 20	733	Sept. 23	619	Sept. 26	542	Sept. 29	588
21	658	24	554	27	605	30	586
22	625	25	548	28	665		

Monthly discharge of Yakima River at Easton, Wash., for the period Sept. 1, 1914, to Sept. 30, 1915.

(Drainage area, 184 square miles.)

Month.	Observed discharge (second-feet).			Run-off (total in acre-feet).			Discharge without storage (second-feet).		Run-off (depth in inches on drainage area).	Accuracy of observed discharge.
	Maximum.	Minimum.	Mean.	Observed.	Stored.[a]	Without storage.	Mean.	Per square mile.		
1914.										
September	990	423	693	41,200	−34,200	7,000	118	0.641	0.72	
1914–15.										
October	997	142	484	29,700	−12,700	17,000	276	1.50	1.73	B.
November	1,600	643	871	51,800	+ 6,880	58,700	986	5.36	5.98	B.
December	646	168	354	21,800	− 5,000	16,800	273	1.48	1.71	B.
January	366	105	160	9,850	+ 2,360	12,200	198	1.08	1.24	C.
February	130	93	108	5,980	+ 4,750	10,700	193	1.05	1.09	B.
March	4,010	98	670	41,200	− 1,400	39,800	647	3.52	4.06	B.
April	2,570	511	1,060	63,000	+30,600	93,600	1,570	8.53	9.52	A.
May	477	113	309	19,000	+20,200	39,200	638	3.47	4.00	A.
June	1,110	72	536	31,900	−12,700	19,200	323	1.76	1.96	A.
July	1,110	707	968	59,500	−48,700	10,800	176	.957	1.10	A.
August	630	148	316	19.400	−16,100	3,300	53.7	.292	.34	A.
September	142	38	97.8	5,820	− 1,670	4,150	69.7	.379	.42	B.
The year	4,010	38	496	359,000	−33,500	325,000	449	2.44	33.15	

[a] Combined storage of Keechelus and Kachess reservoirs.

YAKIMA RIVER AT CLE ELUM, WASH.

Location.—In sec. 27, T. 20 N., R. 15 E., at highway bridge at Cle Elum, in Kittitas County, just above Roslyn Creek, 3 miles below Cle Elum River, and 6½ miles above Teanaway River.

Drainage area.—500 square miles (measured on topographic maps).

Records available.—August 24, 1906, to September 30, 1915.

Gage.—Friez water-stage recorder installed July 12, 1911, on right bank under highway bridge; inspected daily by T. J. Denny. Since August 12, 1910, vertical and inclined staff on right bank 30 feet below bridge. Prior to August 12, 1910, chain gage attached to upstream handrail of bridge at datum varying from 0.14 foot higher to 0.12 foot lower than that of present gage.

Discharge measurements.—Made from highway bridge or by wading.

Channel and control.—Gravel and cobblestones; fairly permanent. One channel at all stages. Control at low water formed by broad riffle about 1,200 feet below gage, at high water by a section of stream bed extending about one-fourth mile below gage.

Extremes of discharge.—Maximum stage during year from water-stage recorder, 6.63 feet at 8 a. m. March 27 (discharge, 7,360 second-feet); minimum stage from recorder, 1.11 feet at 6 p. m. September 30 (discharge, 192 second-feet).

1906–1915: Maximum stage, estimated from high-water marks, 12.5 feet November 14, 1906 (discharge, approximately 25,600 second-feet); minimum stage recorded, 1.11 feet at 6 p. m. September 30, 1915 (discharge, 192 second-feet).

Winter flow.—Stage-discharge relation not seriously affected by ice; open-channel rating curve assumed applicable.

Diversion.—None.

Regulation.—Flow partly regulated by storage and release of water at Keechelus, Kachess, and Cle Elum reservoirs. Monthly discharge, without storage, determined from records of stage at reservoirs.

ACCURACY.—Results excellent except at extremely low water and when stage-discharge relation may have been slightly affected by ice. Rating curve well defined above 300 second- feet.

COOPERATION.—Records of discharge and measurements furnished by United States Reclamation Service.

Discharge measurements of Yakima River at Cle Elum, Wash., during the year ending Sept. 30, 1915.

Date.	Made by—	Gage height.	Discharge.	Date.	Made by—	Gage height.	Discharge.
		Feet.	*Sec.-ft.*			*Feet.*	*Sec.-ft.*
Oct. 3	F. E. Moxley	2.37	800	Mar. 27	F. E. Moxley	6.48	6,980
5	Taylor and Tuttle	1.61	353	Apr. 6	.....do	5.23	4,270
8	.....do	2.13	645	14	.....do	4.70	3,300
Nov. 9	F. E. Moxley	3.98	2,390	May 5	G. L. Parker	3.21	1,490
Feb. 11	.....do	1.38	321	June 17	F. E. Moxley	3.14	1,400
Mar. 11	.....do	1.60	387	July 8	.....do	3.35	1,590

Daily discharge, in second-feet, of Yakima River at Cle Elum, Wash., for the year ending Sept. 30, 1915.

Day.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.
1	791	889	1,890	663	319	331	2,470	1,680	1,180	1,780	1,060	388
2	846	910	1,830	620	314	348	4,120	1,590	1,100	1,780	984	379
3	819	1,500	1,780	579	306	361	6,360	1,550	976	1,780	947	366
4	554	2,400	1,680	540	298	398	6,360	1,590	579	1,780	860	353
5	393	3,120	1,590	518	294	417	5,340	1,550	700	1,780	825	339
6	379	3,430	1,550	508	302	426	4,400	1,460	832	1,780	785	327
7	361	3,190	1,290	497	302	421	3,850	1,500	984	1,730	758	310
8	591	2,680	984	481	302	417	3,600	1,640	1,140	1,500	712	314
9	752	2,400	947	426	298	407	3,270	1,780	1,260	1,340	675	331
10	765	2,190	1,060	417	294	375	2,960	1,890	1,060	1,340	650	323
11	681	2,190	1,020	403	290	375	2,750	1,890	984	1,380	650	319
12	675	2,400	947	393	283	388	2,820	1,780	1,020	1,420	626	306
13	669	2,610	846	393	275	413	2,890	1,640	1,060	1,420	614	302
14	663	2,610	669	388	275	639	3,040	1,550	984	1,420	603	294
15	656	2,190	557	384	267	798	2,960	1,460	1,220	1,420	603	283
16	669	1,940	529	384	267	984	2,680	1,340	1,420	1,420	597	271
17	681	1,780	603	370	275	1,020	2,750	1,300	1,460	1,420	597	267
18	700	1,730	574	361	275	1,020	3,040	1,260	1,550	1,420	585	264
19	812	1,730	540	357	275	984	3,270	1,260	1,550	1,420	568	256
20	984	1,730	1,020	357	275	1,100	3,350	1,260	1,550	1,420	551	256
21	1,100	1,830	1,100	361	283	1,340	3,190	1,260	1,590	1,380	540	249
22	1,060	1,890	867	384	286	1,590	2,960	1,220	1,420	1,380	529	249
23	1,680	1,940	700	403	290	2,060	2,610	1,180	1,500	1,300	508	245
24	1,780	1,940	694	388	302	2,470	2,260	1,220	1,590	1,260	502	242
25	1,680	1,890	681	388	314	2,540	2,120	1,140	1,640	1,220	492	239
26	1,550	1,890	681	393	327	2,580	2,060	1,060	1,730	1,220	481	239
27	1,460	1,890	669	436	323	5,900	1,890	1,180	1,730	1,220	466	235
28	1,100	1,890	540	524	327	3,850	1,830	1,180	1,780	1,180	446	218
29	965	1,940	529	426	....	2,820	1,780	1,340	1,780	1,180	426	202
30	1,380	1,890	546	357	....	2,540	1,780	1,340	1,780	1,180	417	199
31	1,140	....	694	348	....	2,260	....	1,260	....	1,100	403	....

Monthly discharge of Yakima River at Cle Elum, Wash., for year ending Sept. 30, 1915.

[Drainage area, 500 square miles.]

Month.	Observed discharge (second-feet).			Run-off (total in acre-feet).			Discharge without storage (second-feet).		Run-off (depth in inches on drainage area).	Accuracy of observed discharge.
	Maximum.	Minimum.	Mean.	Observed.	Stored.[a]	Without storage.	Mean.	Per square mile.		
October	1,780	361	914	56,200	− 7,620	48,600	790	1.58	1.82	A.
November	3,430	889	2,090	124,000	+17,700	142,000	2,390	4.78	5.33	A.
December	1,890	529	955	58,700	−10,100	48,600	790	1.58	1.82	B.
January	663	348	434	26,700	− 459	26,200	426	.852	.98	B.
February	327	267	294	16,300	+ 5,200	21,500	387	.774	.81	A.
March	5,900	331	1,340	82,400	+ 8,470	90,900	1,480	2.96	3.41	A.
April	6,360	1,780	3,160	188,000	+29,500	218,000	3,660	7.32	8.17	A.
May	1,890	1,060	1,430	87,900	+19,800	108,000	1,760	3.52	4.06	A.
June	1,780	579	1,300	77,400	−22,900	54,500	916	1.83	2.04	A.
July	1,780	1,100	1,430	87,900	−56,600	31,300	509	1.02	1.18	A.
August	1,060	403	628	38,600	−17,500	21,100	343	.686	.79	A.
September	388	199	286	17,000	− 2,800	14,200	239	.478	.53	A.
The year	6,360	199	1,190	861,000	−37,300	825,000	1,140	2.28	30.94	

[a] Combined storage of Keechelus, Kachess and Cle Elum reservoirs.

YAKIMA RIVER AT UMTANUM, WASH.

Location.—In sec. 20, T. 16 N., R. 19 E., at Umtanum, in Kittitas County, half a mile above Umtanum Creek, and 10 miles south of Ellensburg.

Drainage area.—1,620 square miles (measured on topographic maps and Plate I, Water-Supply Paper 369).

Records available.—August 25, 1906, to May 20, 1907; August 10, 1907, to September 30, 1915.

Gage.—Since July 10, 1914, Stevens water-stage recorder referred to vertical staff gage on right bank 100 feet east of Northern Pacific Railway section house at Umtanum; inspected daily by Tom Letos. Barrett & Lawrence water-stage recorder in use September 28, 1911, to July 9, 1914. Vertical staff gage, at same location but at datum 0.16 foot higher than present gage, in use prior to June 26, 1908. From June 26, 1908, to July 9, 1914, cantilever chain gage, at datum 0.13 foot higher than present gage prior to January 1, 1911, and at approximately same datum as present gage thereafter.

Discharge measurements. Made from cable 100 feet above gage or by wading.

Channel and control.—Rocks and gravel, slightly shifting; one channel at all stages.

Extremes of discharge.—Maximum stage during year from water-stage recorder, 7.41 feet at 11 a. m. April 4 (discharge, 9,350 second-feet); minimum stage from recorder, 2.95 feet at 3 p. m. September 21 (discharge, 154 second-feet).

1906–1915: Maximum stage estimated from high-water marks, 14.2 feet November 15 or 16, 1906 (discharge, approximately 41,000 second-feet); minimum stage from water-stage recorder on September 21, 1915.

Winter flow.—Stage-discharge relation seriously affected by ice; flow determined from discharge measurements and record of temperature.

Diversions.—Water diverted above gage for irrigation of about 40,000 acres in Kittitas valley.

Regulation.—Flow partly regulated by diversions and by storage and release of water at Keechelus, Kachess, and Cle Elum reservoirs.

Accuracy.—Results excellent except when flow was below 250 second-feet and when stage-discharge relation was affected by ice.

Cooperation.—Records of discharge and measurements furnished by United States Reclamation Service.

Discharge measurements of Yakima River at Umtanum, Wash., during the year ending, Sept. 30, 1915.

Date.		Made by—	Gage height.	Discharge.	Date.		Made by—	Gage height.	Discharge.
			Feet.	*Sec.-ft.*				*Feet.*	*Sec.-ft.*
Oct	6	R. S. Calland	3.55	591	Apr	7	F. E. Moxley	6.38	5,670
	9	Tuttle and Taylor	3.52	535	May	6	Taylor and Parker	4.48	1,670
Feb	13	F. E. Moxley	3.43	473	June	5	F. E. Moxley	3.67	670
Mar	17	.....do	4.80	2,060		18	.....do	4.21	1,250
	27	.....do	6.74	7,020	July	9	.....do	4.22	1,240

Daily discharge, in second-feet, of Yakima River at Umtanum, Wash., from Sept. 1, 1914 to Sept. 30, 1915.

Day.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.
1	1,220	1,010	1,300	2,300	1,160	......	1,020	3,280	1,910	1,370	1,550	961	284
2	1,280	1,040	1,140	2,300	941	......	1,070	4,920	1,840	1,190	1,540	882	271
3	1,280	1,040	1,620	2,220	853	......	1,120	8,050	1,740	1,060	1,540	824	299
4	1,280	1,010	2,390	2,060	824	......	1,340	9,310	1,660	913	1,530	756	306
5	1,280	843	3,060	1,910	795	569	1,400	8,230	1,630	680	1,550	709	246
6	1,280	662	3,620	1,840	756	550	1,230	6,810	1,580	662	1,550	662	234
7	1,230	487	3,620	1,770	728	532	1,170	5,820	1,530	737	1,580	624	221
8	1,210	487	3,280	1,430	718	541	1,120	5,360	1,600	785	1,500	587	205
9	1,160	624	2,860	1,250	709	541	1,090	4,920	1,770	954	1,240	578	194
10	1,090	843	2,670	1,190	662	541	1,070	4,370	1,990	1,000	1,160	541	199
11	1,080	872	2,570	1,330	633	523	1,030	3,980	2,060	892	1,160	487	205
12	1,020	882	2,670	1,370	624	523	1,040	3,980	1,990	892	1,220	478	205
13	1,020	911	2,960	1,230	624	487	1,020	4,110	1,910	901	1,230	469	216
14	1,060	901	3,170	1,120	624	496	1,110	4,110	1,840	901	1,250	451	216
15	1,100	882	2,860	1,110	624	505	1,560	4,110	1,770	921	1,240	425	205
16	1,160	853	2,570	1,110	633	478	1,990	3,980	1,640	1,050	1,260	425	205
17	1,150	862	2,300	990	596	496	2,060	3,740	1,690	1,180	1,230	425	189
18	1,140	853	2,140	862	633	514	1,990	3,620	1,730	1,250	1,180	425	178
19	1,180	901	2,220	795	709	514	1,910	4,110	1,630	1,320	1,200	392	167
20	1,180	1,040	2,140	862	633	505	1,840	4,110	1,580	1,370	1,170	366	183
21	1,170	1,180	2,300	1,400	596	569	2,060	3,980	1,530	1,380	1,160	358	167
22	1,160	1,240	2,480	1,630	514	624	2,570	3,740	1,460	1,330	1,130	358	205
23	1,160	1,390	2,480	1,300	578	671	3,060	3,390	1,420	1,270	1,110	358	178
24	1,150	1,840	2,390	1,380	569	699	3,740	3,060	1,430	1,360	1,030	351	189
25	1,140	1,840	2,390	1,420	560	843	3,860	3,060	1,460	1,400	1,000	328	178
26	1,130	1,770	2,390	1,500	......	970	3,390	3,060	1,340	1,490	970	314	172
27	1,130	1,700	2,390	1,290	......	921	5,400	2,640	1,280	1,500	970	299	194
28	1,120	1,550	2,390	1,220	......	941	5,360	1,990	1,250	1,580	961	306	183
29	1,010	1,220	2,390	1,300	......	......	3,980	1,910	1,420	1,580	961	291	183
30	1,010	1,300	2,390	1,320	......	......	3,620	1,910	1,500	1,560	990	284	178
31	......	1,500	......	1,140	......	......	3,390	......	1,510	......	990	284	......

NOTE.—Discharge determined as follows: Sept. 7-27, 1914 (revised since publication in Water-Supply Paper 392), by method devised for shifting control; Sept. 28, 1914, to Sept. 30, 1915, from rating curve well defined above and fairly well defined below 250 second-feet. Stage-discharge relation seriously affected by ice during winter; flow estimated from current-meter measurements and records of temperature as follows: Jan. 26-30, 625 second-feet; Jan. 31-Feb. 4, 600 second-feet.

Monthly discharge of Yakima River at Umtanum, Wash., for the year ending Sept. 30, 1915.

Month.	Discharge in second-feet.			Run-off (total in acre-feet).	Accuracy.
	Maximum.	Minimum.	Mean.		
October	1,840	487	1,080	66,400	A.
November	3,620	1,140	2,500	149,000	A.
December	2,300	795	1,420	87,300	B.
January	1,160	514	678	41,700	B.
February	970	478	605	33,600	B.
March	5,400	1,020	2,180	134,000	A.
April	9,310	1,910	4,320	257,000	A.
May	2,060	1,250	1,640	101,000	A.
June	1,580	662	1,150	68,400	A.
July	1,580	961	1,230	75,600	A.
August	931	284	483	29,700	A.
September	306	167	208	12,400	B.
The year	9,310	167	1,460	1,060,000	

NOTE.—Revised mean discharge for September, 1914, 1,150 second-feet; run-off, 68,500 acre-feet.

YAKIMA RIVER NEAR WAPATO, WASH.

LOCATION.—In sec. 28, T. 12 N., R. 19 E., below Sunnyside diversion dam, 2 miles below Union Gap, 3 miles north of Wapato, in Yakima County, and 11 miles below Naches River.

DRAINAGE AREA.—3,560 square miles (measured on topographic maps and Plate I, Water-Supply Paper 369).

RECORDS AVAILABLE.—April 25, 1908, to September 30, 1915.

GAGE.—From February 18, 1909, to October 23, 1914, cantilever chain gage on left bank about 600 feet below Sunnyside diversion dam; datum lowered 2.00 feet January 1, 1914. After October 23, inclined staff at same site and datum. Stevens water-stage recorder installed August 17, 1915; prior to that date gage read to hundredths two or three times daily by Henry Hanson. From September 25, 1908, to February 17, 1909, hook gage in stilling well anchored to retaining wall on left bank, 25 feet above head gate of Sunnyside canal; datum at same elevation as crest of diversion dam.

DISCHARGE MEASUREMENTS.—Made from cable 80 feet above gage or by wading.

CHANNEL AND CONTROL.—Solid rock, large boulders, and gravel. One channel at all stages. Control formed by diagonal riffle just below Oregon-Washington Railroad & Navigation Co.'s bridge and about 250 feet below gage; may shift slightly during extreme floods. Supports of railway bridge form partial control at high stages.

EXTREMES OF DISCHARGE.—Maximum stage recorded during year, 9.44 feet at 6.15 a. m. April 4 (discharge, 15,500 second-feet); minimum stage from water-stage recorder, 1.23 feet August 27 and 28 (discharge, practically zero).

1908–1915: Maximum stage recorded, 9.82 feet November 25, 1909 (discharge, 33,400 second-feet); minimum stage recorded, −0.65 foot October 26, 1911, and 1.23 feet August 27 and 28, 1915 (discharge, practically zero).

WINTER FLOW.—Stage-discharge relation not seriously affected by ice; open-channel rating curve assumed applicable.

DIVERSIONS.—Water diverted above gage for irrigation of about 250,000 acres of land.

REGULATION.—Flow partly regulated by diversions and by storage and release of water at Keechelus, Kachess, Cle Elum, and Bumping reservoirs.

ACCURACY.—Results excellent except at low water and when stage-discharge relation may have been affected by ice.

COOPERATION.—Records of discharge and measurements, furnished by United States Reclamation Service.

Discharge measurements of Yakima River near Wapato, Wash., during the year ending Sept. 30, 1915.

Date.	Made by—	Gage height.	Discharge.	Date.	Made by—	Gage height.	Discharge.
		Feet.	*Sec.-ft.*			*Feet.*	*Sec.-ft.*
Oct. 14	H. W. Humphrey......	3.75	921	June 11	F. E. Moxley..........	2.11	79
Nov. 11	.....do.................	5.99	3,720	14	.....do.................	1.58	10
Jan. 29	Calland and Moxley....	4.01	1,130	28	.....do.................	2.19	102
Mar. 22	F. E. Moxley..........	6.00	4,010	Aug. 10	.....do.................	1.62	14
Apr. 3	.....do.................	9.07	13,600	19	.....do.................	1.62	13
May 8	Taylor and Paulsen....	3.99	1,190	Sept. 24	R. S. Calland..........	1.63	15
June 7	Moxley and Calland....	2.77	333	24	Calland and Moxley....	1.62	16

Daily discharge, in second feet, of Yakima River near Wapato, Wash., for the year ending Sept. 30, 1915.

Day.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.
1	651	2,060	4,040	1,680	1,100	1,800	5,300	1,680	1,450	86	24	2
2	684	2,200	3,850	1,680	1,130	1,800	8,280	1,680	1,130	55	11	14
3	751	2,960	4,040	1,450	1,130	1,800	13,300	1,680	823	53	12	5
4	684	4,860	3,660	1,560	1,030	2,060	15,300	1,340	620	237	8	7
5	499	5,080	3,480	1,450	1,130	2,490	12,800	1,230	340	350	24	6
6	417	5,530	3,300	1,340	1,030	2,200	10,800	1,080	310	401	6	10
7	370	5,760	3,300	1,340	1,030	2,060	9,300	985	281	320	6	7
8	267	5,300	3,130	1,280	1,030	2,060	8,610	1,130	272	200	7	4
9	355	4,650	2,640	1,280	1,030	1,930	7,960	1,450	114	30	15	6
10	684	4,240	2,340	1,230	1,030	1,930	7,350	2,200	228	7	8	8
11	860	4,040	2,060	1,180	1,030	1,930	6,510	2,200	102	8	12	19
12	860	4,040	2,060	1,180	985	1,930	6,510	1,930	39	10	13	17
13	1,030	4,650	1,930	1,180	940	1,930	6,780	1,809	12	34	15	24
14	940	5,080	1,800	1,180	940	1,930	6,510	1,680	12	136	5	22
15	940	4,650	1,800	1,080	900	2,640	6,250	1,450	12	64	3	14
16	1,080	4,240	1,680	985	940	2,800	6,000	1,230	8	84	7	28
17	1,080	4,040	1,560	985	1,030	3,660	5,760	1,340	246	109	25	12
18	1,130	3,660	1,230	1,030	1,030	3,480	6,250	1,680	201	64	23	6
19	1,280	3,480	1,340	1,080	985	3,300	6,780	1,450	119	48	19	9
20	1,560	3,480	1,560	1,080	985	3,300	6,510	1,450	111	22	15	9
21	1,680	4,040	1,930	985	1,130	3,480	6,000	1,230	150	35	5	16
22	1,680	4,240	2,200	860	1,180	4,040	4,650	1,080	109	58	18	12
23	1,680	4,240	2,640	860	1,280	5,530	4,040	985	18	73	6	13
24	2,200	4,240	2,340	940	1,340	6,000	3,300	1,030	13	37	2	13
25	2,340	4,040	2,340	860	1,560	6,250	2,800	985	88	22	0	12
26	2,340	4,040	2,200	786	1,680	5,760	2,490	860	58	13	0	17
27	2,340	4,040	2,060	860	1,560	5,760	2,060	823	98	13	0	12
28	2,340	4,040	1,930	940	1,560	7,960	1,680	1,280	102	44	0	13
29	1,930	4,040	1,680	1,180	....	6,250	1,680	1,560	114	26	1	14
30	1,560	4,040	1,560	1,340	....	5,530	1,680	1,450	95	62	5	17
31	1,930	....	1,560	1,230	....	5,530	....	1,560	....	88	1	....

NOTE.—Discharge Oct. 1-20, ascertained from a well-defined rating curve; Oct. 21 to Sept. 30, from a rating curve poorly defined below 75 second-feet, fairly well defined from 75 to 350 second-feet, and well defined above that point.

Monthly discharge of Yakima River near Wapato, Wash., New Reservation, Old Reservation, and Sunnyside canals, for the year ending Sept. 30, 1915.

Month.	Discharge (second-feet).							Run-off in acre-feet.	
	River.			New Reservation canal (mean).	Old Reservation canal (mean).	Sunnyside canal (mean.)	Total mean.[a]	River.	Total.[a]
	Maximum.	Minimum.	Mean.						
October	2,340	267	1,230	70.5	36.3	357	1,690	75,600	104,000
November	5,760	2,060	4,170	....	....	18.3	4,190	248,000	249,000
December	4,040	1,230	2,360	....	....	....	2,360	145,000	145,000
January	1,680	786	1,160	....	....	....	1,160	71,600	71,300
February	1,680	900	1,130	....	....	....	1,130	63,000	62,800
March	7,960	1,800	3,520	....	....	184	3,700	216,000	228,000
April	15,300	1,680	6,440	269	130	671	7,510	383,000	447,000
May	2,200	823	1,400	596	236	852	3,080	86,300	189,000
June	1,450	8	242	541	152	891	1,830	14,400	109,000
July	401	7	90.2	469	134	913	1,610	5,550	99,000
August	25	0	9.55	315	43.3	473	841	587	51,700
September	28	2	12.6	120	5.1	248	386	750	23,000
The year	15,300	0	1,810	....	....	....	2,460	1,310,000	1,780,000

[a] Totals are comparable with monthly values previously determined for Yakima River at Union Gap, near Yakima, Wash.

NOTE.—For records of flow of the three canals see pp. 239-243.

YAKIMA RIVER NEAR PROSSER, WASH.

LOCATION.—In the SE. ¼ sec. 36, T. 9 N., R. 24 E., 1¼ miles northeast of Prosser, in Benton County, 40 miles above mouth.

DRAINAGE AREA.—5,340 square miles (measured on project map of United States Reclamation Service).

RECORDS AVAILABLE.—June 1 to October 10, 1904; June 8 to December 30, 1905; February 1 to October 12, 1906; and August 4 ,1913, to September 30, 1915.

GAGE.—Since August 4, 1913, Stevens water-stage recorder referred to vertical and inclined staff on right bank, 1¼ miles below Prosser and Prosser Falls; inspected once daily by T. Martinson. From June 1, 1904, to December 30, 1905, chain gage on highway bridge 600 feet below Prosser Falls. From February 1 to October 12, 1906, inclined staff at approximately same site as present gage but at different datum.

DISCHARGE MEASUREMENTS.—Made from cable 1,000 feet above gage or from a boat.

CHANNEL AND CONTROL.—Rock and large boulders; will not change except during floods. Control formed by broad riffle about 800 feet below gage.

EXTREMES OF DISCHARGE.—Maximum stage during year from water-stage recorder, 9.12 feet at 1 p. m. April 5 (discharge, 14,200 second-feet); minimum stage from recorder, 0.64 foot at 6 p. m. September 29 (discharge, 272 second-feet).

1904–1906 and 1914–15: Maximum flow measured by floats (not referred to gage) at 3 p. m. November 17, 1906 (discharge, 62.800 second-feet); maximum stage occurred at 9 a. m. on same date at stage three-fourths inch above that of measurement; minimum stage recorded, 2.60 feet August 19, 26, 30, 31 and September 30, 1906 (discharge, approximately 40 second-feet).

WINTER FLOW.—Stage-discharge relation not seriously affected by ice; open-channel rating curve assumed applicable.

DIVERSION.—Water diverted above gage for irrigation of about 250,000 acres of land.

REGULATION.—Flow partly regulated by diversions and by storage and release ot water of Keechelus, Kachess, Cle Elum, and Bumping reservoirs.

Accuracy.—Rating curve well defined above 600 second-feet and fairly well defined below. Results excellent October to May except for short intervals during December and January, when stage-discharge relation may have been slightly affected by ice; good for remainder of year.

Cooperation.—Records of discharge and measurements furnished by United States Reclamation Service.

Discharge measurements of Yakima River near Prosser, Wash., during the year ending Sept. 30, 1915.

Date.	Made by—	Gage height.	Discharge.	Date.	Made by—	Gage height.	Discharge.
		Feet.	*Sec.-ft.*			*Feet.*	*Sec.-ft.*
Oct. 2	Tuttle and Taylor	2.47	1,170	Mar. 26	F. E. Moxley	6.35	6,880
15	H. W. Humphrey	2.73	1,370	29	Paul Taylor	6.99	8,350
Nov. 12	.....do	4.91	3,920	May 7	Parker and Taylor	3.18	1,870
Jan. 23	.....do	2.57	1,260	June 25	F. E. Moxley	1.28	433
Feb. 13	.....do	2.82	1,310	25	.....do	1.27	432
Mar. 9	F. E. Moxley	3.86	2,580	Sept. 30	Calland and Moxley	1.05	369

Daily discharge, in second-feet, of Yakima River near Prosser, Wash., for the year ending Sept. 30, 1915.

Day.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.
1	1,230	2,500	4,140	2,060	1,620	2,330	6,350	2,330	1,890	395	353	343
2	1,190	2,440	4,140	2,170	1,570	2,440	6,560	2,330	1,840	395	380	351
3	1,170	2,550	4,140	2,060	1,570	2,390	9,920	2,330	1,620	364	380	348
4	1,190	3,800	4,140	1,890	1,520	2,500	13,200	2,280	1,320	375	377	321
5	1,160	5,150	3,890	1,780	1,520	2,920	13,800	2,110	1,090	461	389	301
6	1,090	5,550	3,730	1,840	1,570	2,920	12,900	2,000	904	453	380	336
7	948	5,950	3,580	1,950	1,520	2,730	11,300	1,840	828	453	380	343
8	911	5,750	3,510	1,840	1,470	2,670	10,200	1,670	776	506	348	343
9	841	5,150	3,240	1,840	1,520	2,610	9,400	1,780	751	510	372	340
10	855	4,770	2,980	1,780	1,520	2,610	8,630	2,060	698	461	369	340
11	1,190	4,410	2,790	1,730	1,620	2,550	7,890	2,440	586	395	367	336
12	1,370	4,060	2,550	1,670	1,520	2,550	7,430	2,500	515	428	361	314
13	1,370	4,320	2,110	1,670	1,470	2,550	7,430	2,390	497	410	361	328
14	1,420	4,770	2,110	1,670	1,470	2,610	7,660	2,280	510	395	353	340
15	1,420	5,150	2,060	1,620	1,470	2,920	7,210	2,110	488	392	330	346
16	1,470	4,770	2,280	1,520	1,420	3,660	6,770	1,950	480	392	356	340
17	1,570	4,410	2,280	1,420	1,420	4,410	6,560	1,890	457	392	351	343
18	1,570	4,060	2,060	1,420	1,470	4,410	6,350	1,950	434	356	358	343
19	1,620	3,810	1,950	1,420	1,520	4,410	6,770	2,060	445	389	348	321
20	1,780	3,730	1,840	1,470	1,520	4,140	7,210	2,000	414	407	346	336
21	2,000	3,660	2,170	1,470	1,570	3,970	6,990	1,890	438	404	343	346
22	2,100	4,230	2,170	1,370	1,620	4,320	6,350	1,780	431	395	307	346
23	2,170	4,500	2,280	1,280	1,670	4,960	5,350	1,670	417	392	330	338
24	2,170	4,410	2,500	1,280	1,780	5,750	4,500	1,620	407	383	364	312
25	2,610	4,320	2,330	1,230	2,060	6,770	3,730	1,570	410	356	361	307
26	2,790	4,230	2,170	1,190	2,170	6,770	3,370	1,520	424	380	351	319
27	2,730	4,230	2,280	1,160	2,390	6,560	2,980	1,420	410	383	330	336
28	2,730	4,230	2,330	1,140	2,220	7,660	2,670	1,230	401	377	340	351
29	2,730	4,230	2,220	1,320	....	8,380	2,440	1,620	407	375	310	314
30	2,440	4,320	2,110	1,520	....	6,990	2,330	2,000	389	372	343	312
31	2,220	....	2,000	1,670	....	6,560	....	1,950	....	377	351	....

Monthly discharge of Yakima River near Prosser, Wash., for the year ending Sept. 30, 1915.

Month.	Discharge in second-feet.			Run-off (total in acre-feet).	Accuracy.
	Maximum.	Minimum.	Mean.		
October	2,790	841	1,680	103,000	A.
November	5,950	2,440	4,320	257,000	A.
December	4,140	1,840	2,710	167,000	B.
January	2,170	1,140	1,600	98,100	B.
February	2,390	1,420	1,630	90,800	A.
March	8,380	2,330	4,160	256,000	A.
April	13,800	2,330	7,140	425,000	A.
May	2,500	1,230	1,950	120,000	A.
June	1,890	389	689	41,000	B.
July	510	356	404	24,800	B.
August	389	307	354	21,800	B.
September	351	301	333	19,800	B.
The year	13,800	301	2,240	1,620,000	

YAKIMA RIVER AT KIONA, WASH.

Location.—In sec. 19, T. 9 N., R. 27 E., at highway bridge at Kiona, in Benton County, about 3½ miles below intake of Kiona canal, and about 25 miles above mouth.

Drainage area.—5,520 square miles (measured on topographic maps and Plate I, Water-Supply Paper 369).

Records available.—August 20, 1895, to March 31, 1915, when station was discontinued.

Gage.—Chain gage on upstream guardrail of bridge about 1,800 feet northwest of Northern Pacific Railway station at Kiona; read to hundredths once daily by J. H. Kennedy.

Discharge measurements.—Made from highway bridge or by wading.

Channel and control.—Gravel and boulders; slightly shifting at high stages. One channel at all stages. Control formed by broad riffle about 1,000 feet below gage.

Extremes of discharge.—Maximum stage recorded October 1, 1914, to March 31, 1915, 9.20 feet at 9 a. m., March 29 (discharge, 8,980 second-feet); minimum stage recorded, 4.00 feet at 9 a. m. October 11 (discharge, 725 second-feet).

1896–1915: Maximum stage recorded, 19.78 feet, November 17, 1906 (discharge, 63,500 second-feet); minimum stage recorded, 2.35 feet, September 11, 1906 (discharge, 105 second-feet).

Winter flow.—Stage-discharge relation not seriously affected by ice; open-channel rating curves assumed applicable.

Diversions.—Water diverted above gage for irrigation of about 260,000 acres of land.

Regulation.—Flow partly regulated by diversions and by storage and release of water at Keechelus, Kachess, Cle Elum, and Bumping reservoirs.

Accuracy.—Stage-discharge relation possibly affected slightly by ice for short periods in December and January. Results fair for October, good November to March.

Cooperation.—Records of discharge and measurements furnished by United States Reclamation Service.

Discharge measurements of Yakima River at Kiona, Wash., during the period Oct. 1, 1914, to Mar. 31, 1915.

Date.	Made by—	Gage height.	Discharge.	Date.	Made by—	Gage height.	Discharge.
		Feet.	*Sec.-ft.*			*Feet.*	*Sec.-ft.*
Oct. 6	H. W. Humphrey	4.37	1,160	Feb. 15	H. W. Humphrey	4.66	1,410
Nov. 9	.....do	7.51	5,360	Mar. 9	F. E. Moxley	5.75	2,740
Dec. 14	.....do	5.29	1,780	25	.....do	8.27	6,750
Jan. 21	.....do	4.72	1,510				

Daily discharge, in second-feet, of Yakima River at Kiona, Wash., from Oct. 1, 1914, to Mar. 31, 1915.

Day.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Day.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.
1	1,210	2,300	4,160	1,820	1,580	2,270	16	1,320	4,860	1,710	1,480	1,390	3,330
2	1,210	2,300	4,160	1,930	1,580	2,270	17	1,320	4,500	1,930	1,480	1,390	4,500
3	1,160	2,300	4,160	1,930	1,580	2,540	18	1,320	4,160	1,710	1,390	1,480	4,500
4	1,210	3,170	4,160	1,710	1,580	2,400	19	1,320	3,820	1,710	1,390	1,480	4,680
5	1,260	4,680	3,820	1,710	1,480	2,680	20	1,500	3,820	1,600	1,480	1,480	4,160
6	1,160	5,040	3,820	1,600	1,580	3,100	21	1,820	3,650	1,410	1,390	1,480	4,160
7	1,000	5,600	3,650	1,710	1,480	3,100	22	1,930	4,160	1,500	1,390	1,580	4,160
8	1,000	5,800	3,490	1,820	1,480	2,820	23	1,930	4,500	1,820	1,210	1,580	4,500
9	920	5,410	3,170	1,780	1,480	2,680	24	1,930	4,500	2,170	1,210	1,680	5,040
10	843	4,860	2,860	1,780	1,480	2,680	25	2,300	4,330	2,300	1,160	1,780	5,600
11	725	4,500	2,570	1,680	1,480	2,680	26	2,710	4,160	2,300	1,160	2,140	6,800
12	1,050	4,160	2,300	1,580	1,480	2,680	27	2,710	3,820	2,050	1,000	2,140	6,400
13	1,230	4,330	1,820	1,580	1,480	2,680	28	2,570	4,330	2,170	1,160	2,140	7,000
14	1,230	4,860	1,930	1,580	1,480	2,820	29	2,570	4,330	2,300	1,300	......	8,960
15	1,230	5,220	1,600	1,580	1,480	2,820	30	2,300	4,330	2,050	1,580	......	7,840
							31	2,050	......	1,820	1,680	......	6,800

NOTE.—Discharge ascertained from two fairly well defined curves applicable Oct. 1-10, Jan. 9 to Mar. 15; and Oct. 11 to Jan. 8, Mar. 16-31.

Monthly discharge of Yakima River at Kiona, Wash., for the period Oct. 1, 1914, to Mar. 31, 1915.

Month.	Discharge in second-feet.			Run-off (total in acre-feet).	Accuracy.
	Maximum.	Minimum.	Mean.		
October	2,710	725	1,550	95,200	C.
November	5,800	2,300	4,260	253,000	B.
December	4,160	1,410	2,520	155,000	B.
January	1,930	1,000	1,520	93,700	B.
February	2,140	1,390	1,590	88,100	B.
March	8,960	2,270	4,150	255,000	B.
The period				940,000	

KACHESS LAKE NEAR EASTON, WASH.

LOCATION.—In sec. 34, T. 21 N., R. 13 E. (unsurveyed), at lake outlet, 2½ miles northwest of Easton, in Kittitas County.

DRAINAGE AREA.—63 square miles (measured on topographic maps).

RECORDS AVAILABLE.—September 20, 1905, to September 30, 1915.

GAGE.—In three sections; datum, mean sea level; read to hundredths twice daily by I. Pennington. Highest section, installed October 6, 1914, is inclined and is anchored to rock paving on upstream face of storage dam, between outlet conduit and east end of dam; middle section, installed October 31, 1914, is inclined and is anchored to rock paving on upstream face of back fill dam at former outlet of lake; lowest section, installed September 28, 1915, is set vertically in dredged channel about half way between back fill dam and open water in lake. Original gage used until September 5, 1911, was a vertical staff on east side of lake, at boat landing, 400 feet above temporary timber crib dam at outlet; zero at elevation 2,226.02 feet. From September 6, 1911, until installation of present sections, a vertical staff on face of gate tower at outlet through new storage dam.

Extremes of storage.—Maximum stage recorded during year, 2,227.55 feet June 12 (storage, 99,860 acre-feet); minimum stage recorded, 2,197.73 feet September 26–27 (storage, 13,730 acre-feet).

1906–1915: Maximum stage recorded, 2.235.50 feet at 6 p. m. November 15, 1906 (storage, present storage plane, 128,620 acre-feet); minimum stage recorded, 2,197.73 feet, September 26–27, 1915 (storage, 13,730 acre-feet).

Storage.—Capacity of reservoir at crest of spillway, 221,000 acre-feet (revised). Elevation of gate sill and spillway crest, 2,192.75 feet and 2,258.00 feet, respectively. Storage or release each month used for determining discharge, without storage, for gaging station below dam.

Cooperation.—Computations of storage furnished by United States Reclamation Service.

Storage in acre-feet of Kachess Lake near Easton, Wash., for the year ending Sept. 30, 1915.

Day.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.
1	27,240	20,500	29,580	26,990	31,180	36,220	49,160	80,550	96,530	78,100	30,620	15,920
2	26,410	20,640	29,580	27,130	31,460	36,220	50,850	81,270	96,880	76,520	29,470	15,700
3	25,450	22,290	29,440	27,270	31,740	36,360	52,830	81,840	97,230	74,650	28,390	15,500
4	25,590	23,520	29,300	27,270	32,300	36,360	55,090	82,280	97,580	72,780	27,770	15,390
5	25,860	24,900	29,160	27,270	32,860	36,500	56,790	82,710	97,930	71,210	27,130	15,280
6	26,140	25,720	29,020	27,270	33,420	36,640	58,210	83,140	98,280	69,340	26,350	15,170
7	26,280	26,550	28,890	27,270	33,420	36,780	59,630	83,720	98,630	67,620	25,680	15,030
8	25,450	26,820	28,480	27,270	33,560	36,780	60,770	84,300	98,980	66,050	25,070	15,030
9	24,630	27,380	28,200	27,550	33,560	36,920	61,910	84,880	99,330	64,760	24,450	15,090
10	24,080	27,920	28,340	27,690	33,700	36,920	63,050	85,600	99,510	62,910	24,030	14,920
11	23,800	28,200	28,480	27,830	33,700	37,060	64,190	86,040	99,680	61,340	23,560	14,810
12	23,250	28,750	28,680	28,110	33,700	37,200	65,050	86,620	99,860	59,920	23,110	14,700
13	22,840	29,160	28,890	28,390	33,840	37,340	66,190	87,200	99,680	58,070	22,610	14,670
14	22,420	29,850	29,020	28,660	33,840	37,620	67,050	87,780	99,330	56,510	22,140	14,610
15	22,150	29,850	29,020	28,940	33,980	38,460	68,050	88,210	98,980	54,950	21,530	14,480
16	21,880	29,850	29,020	29,220	33,980	38,740	69,050	88,500	98,280	53,390	20,950	14,390
17	21,600	29,850	29,020	29,360	33,980	39,160	70,060	89,080	97,580	51,840	20,360	14,390
18	21,460	29,580	29,020	29,500	34,260	39,590	70,920	89,520	96,530	50,140	20,110	14,360
19	21,880	29,580	28,890	29,500	34,400	40,150	72,070	89,960	95,650	48,450	19,610	14,280
20	21,740	29,580	28,610	29,640	34,400	40,710	73,220	90,390	94,780	46,900	19,330	14,200
21	21,740	29,580	28,060	29,640	34,540	41,270	74,220	90,680	93,920	45,210	19,000	14,120
22	22,150	29,580	27,650	29,780	34,820	41,690	75,080	91,150	92,700	43,520	18,690	14,000
23	21,320	29,580	27,380	29,780	35,100	42,120	75,940	91,670	91,320	42,120	18,390	13,980
24	20,910	29,440	27,100	29,780	35,520	42,680	76,520	92,180	89,810	40,710	18,080	13,840
25	20,500	29,580	26,820	29,780	35,800	43,520	77,090	92,700	88,210	39,300	17,780	13,780
26	20,090	29,580	26,550	29,920	35,940	44,360	77,520	93,050	86,620	37,760	17,470	13,730
27	19,810	29,580	26,280	30,060	35,940	45,070	78,100	93,570	85,020	36,220	17,140	13,730
28	20,640	29,580	26,550	30,340	36,080	45,630	78,680	94,440	83,290	35,100	16,860	13,920
29	20,500	29,580	26,550	30,620	....	46,480	79,400	94,960	81,560	33,860	16,580	13,920
30	20,500	29,580	26,820	30,760	....	47,320	79,970	95,480	79,970	32,690	16,330	13,980
31	20,500	....	26,820	30,900	....	48,030	....	96,000	....	31,710	16,140	....

KACHESS RIVER NEAR EASTON, WASH.

Location.—In sec. 3, T. 20 N., R. 13 E., one-fourth mile below Kachess storage dam, three-fourths mile above mouth, and 2 miles northwest of Easton, in Kittitas County.

Drainage area.—63 square miles (measured on topographic maps).

Records available.—November 20, 1903, to September 30, 1915.

Gage.—Since July 22, 1913, Stevens water-stage recorder; inspected once each day by I. Pennington. Inclined staff on left bank, one-fourth mile below Kachess storage dam, in use since station was established. It was reconstructed at same site and datum January 10, 1906.

Discharge measurements.—Made from cable 20 feet below gage or by wading.

Channel and control.—Light gravel and sand; shifts frequently. One channel at all stages. Control formed by broad riffle 125 feet below gage. Prior to construction work for new dam in 1911 and 1912, control was formed by large bowlders and was fairly permanent.

Extremes of discharge.—Maximum stage during year from water-stage recorder, 6.72 feet at 2 p. m. July 2 (discharge, 985 second-feet); minimum flow occurred frequently when gates in dam were closed (discharge, practically zero).

1904–1915: Maximum stage recorded, 8.0 feet at 8.30 a. m. November 16, 1906 (discharge, 1, 760[a] second-feet); minimum flow occurs when gates in dam are closed (discharge, practically zero).

Winter flow.—Stage-discharge relation not seriously affected by ice. Gates closed during part of frozen season.

Diversions.—None.

Regulation.—Flow controlled by storage and release of water in Kachess reservoir. Monthly discharge, without storage, determined from records of stage of reservoir.

Accuracy.—Record of discharge for September doubtful, owing to uncertain date for change in rating.

Cooperation.—Records of discharge and measurements furnished by United States Reclamation Service.

Discharge measurements of Kachess River near Easton. Wash., during the year ending Sept. 30, 1915.

Date.	Made by—	Gage height.	Discharge.	Date.	Made by—	Gage height.	Discharge.
		Feet.	*Sec.-ft.*			*Feet.*	*Sec.-ft.*
Oct. 1	F. E. Moxley..........	5.06	422	June 15	F. E. Moxley..........	4.80	373
Dec. 14	.....do..................	3.86	89	July 2	.....do..................	6.60	945
May 4	Parker and Taylor.....	3.20	[b] .8	13	.....do..................	6.49	895

[a] Revised from original data. A stage of 7.5 feet was reached Nov. 25, 1909, and the discharge of 1,790 second-feet published for this data in Water-Supply Paper 272, p. 174. and Water-Supply Paper 369, p. 62, is probably too large.

[b] Estimated.

Daily discharge, in second-feet, of Kachess River near Easton, Wash., for the year ending Sept. 30, 1915.

Day.	Oct.	Nov.	Dec.	Jan.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.
1	430	132	243	76	......	7	8	......	944	550	134
2	445	132	240	76	......	10	8	......	978	520	132
3	318	134	240	76	......	9	9	......	978	460	125
4	2	140	240	76	......	7	8	......	978	415	130
5	2	145	240	76	......	6	7	......	978	385	120
6	2	147	240	76	......	4	5	......	944	361	113
7	125	147	240	76	......	4	5	......	859	316	109
8	430	147	234	27	......	4	4	......	808	289	109
9	385	150	234	......	......	2	4	......	808	283	109
10	361	150	83	......	......	2	4	......	825	274	107
11	325	150	......	......	......	2	4	......	876	253	102
12	299	150	......	......	......	2	4	85	876	247	100
13	282	196	......	......	......	2	4	217	910	242	98
14	254	243	46	......	......	2	4	354	910	236	94
15	226	243	87	......	1	1	3	271	876	228	92
16	213	243	87	......	1	1	3	370	876	228	92
17	190	243	87	......	2	1	3	475	876	222	90
18	189	243	87	......	3	1	3	550	876	217	87
19	191	243	147	......	3	1	3	550	876	209	87
20	189	243	226	......	2	1	3	550	876	206	87
21	149	243	226	......	2	1	3	612	876	192	83
22	156	243	226	......	2	1	......	708	825	190	81
23	311	243	226	......	2	24	......	859	774	185	79
24	308	243	223	......	3	88	......	910	774	179	79
25	291	243	223	......	3	129	......	910	774	174	77
26	279	243	221	......	2	175	......	910	774	169	77
27	109	243	132	......	2	9	......	944	741	162	53
28	79	240	78	......	2	9	......	944	708	154	0
29	127	240	76	......	2	9	......	944	660	152	0
30	127	243	76	......	2	8	......	944	628	142	0
31	132	......	76	......	3	......	......	......	581	137	......

NOTE.—Discharge Oct. 1 to Apr. 26, ascertained from fairly well defined rating curve; Apr. 27 to Sept. 30, from rating curve fairly well defined between 75 and 300 second-feet, well defined above and poorly defined below those limits. Practically no flow Dec. 11–13, Jan. 9 to Mar. 14, and May 22 to June 11.

Monthly discharge of Kachess River near Easton, Wash., for the year ending Sept. 30, 1915.

[Drainage area, 63 square miles.]

Month.	Observed discharge (second-feet).			Run-off (total in acre-feet).			Discharge without storage (second-feet).		Run-off (depth in inches on drainage area).	Accuracy of observed discharge.
	Maximum.	Minimum.	Mean.	Observed.	Stored.	Without storage.	Mean.	Per square mile.		
October	445	2	224	13,800	− 7,420	6,380	104	1.65	1.90	B.
November	243	132	202	12,000	+ 9,080	21,100	355	5.63	6.28	B.
December	243	0	154	9,490	− 2,750	6,740	110	1.75	2.02	B.
January	76	0	18	1,110	+ 4,070	5,180	84.2	1.34	1.54	C.
February	0	0	0	0	+ 5,180	5,180	93.3	1.48	1.54	
March	3	0	1.19	73	+12,000	12,100	197	3.13	3.61	D.
April	175	1	17.4	1,040	+31,900	32,900	553	8.78	9.80	C.
May	7	0	3.19	196	+16,000	16,200	263	4.17	4.81	C.
June	944	0	404	24,000	−16,000	8,000	134	2.13	2.38	A.
July	978	581	840	51,600	−48,300	3,300	53.7	.85	.98	A.
August	550	137	257	15,800	−15,600	200	3.26	.05	.06	B.
September	134	0	88.2	5,250	− 2,160	3,090	51.9	.82	.92	C.
The year	978	0	186	134,000	−14,000	120,000	166	2.63	35.84	

CLE ELUM LAKE NEAR ROSLYN, WASH.

Location.—In sec. 10, T. 20 N., R. 14 E., at lake outlet, 4 miles northwest of Roslyn in Kittitas County, and about 7½ miles northwest of Cle Elum.

Drainage area.—202 square miles (measured on topographic maps).

Records available.—May 4 to June 9, 1906; October 1, 1906, to September 30, 1915.

Gage.—Since June 17, 1907, vertical staff on left abutment of temporary crib dam, zero at elevation of gate sills, 2,122.75 feet. Considerable fall between lake and dam for stages below 5.0 feet. Auxiliary gages installed October, 1907, and July 16, 1915, at same datum about 200 feet above dam used to obtain true lake elevations at low stages; read to hundredths twice daily by A. D. Nichols. Prior to June 17, 1907, vertical staff in lake above outlet at datum 0.45 foot lower than present gage. Simultaneous readings on this and present gage July 7 to October 31, 1907.

Extremes of storage.—Maximum stage recorded during year, 14.31 feet April 3 (storage, 31,150 acre-feet); minimum stage recorded, 2.11 feet September 30 (storage, 4,380 acre-feet).

1907–1915: Maximum stage recorded, 16.70 feet November 24, 1909 (storage, 37,050 acre-feet); minimum stage estimated, 1.15 feet August 31, 1906 (storage, 2,380 acre-feet).

Storage.—Capacity of reservoir, at crest of spillway (gage height, 11.3 feet), 24,100 acre-feet. Storage or release each month used for determining discharge, without storage, for gaging station below dam.

Cooperation.—Storage records furnished by United States Rclamation Service.

Storage, in acre-feet, of Cle Elum Lake near Roslyn, Wash., for the year ending Sept. 30, 1915.

Day.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.
1	8,630	15,130	24,260	18,800	16,380	16,900	26,960	25,420	24,810	13,660	6,840	5,470
2	9,260	16,880	24,210	18,740	16,470	16,920	29,210	25,210	24,540	12,830	6,770	5,430
3	9,310	21,810	22,700	18,630	16,510	17,010	31,150	25,120	24,420	12,100	6,730	5,430
4	9,560	26,090	21,670	18,630	16,550	17,070	30,670	24,810	24,900	11,250	6,560	5,340
5	9,600	27,520	20,720	18,610	16,770	17,030	29,640	24,580	25,300	10,470	6,520	5,340
6	9,730	27,910	20,120	18,610	16,770	17,110	28,880	24,670	25,810	9,510	6,460	5,300
7	9,820	27,570	20,100	18,610	16,770	17,370	28,500	24,980	26,040	8,140	6,370	5,280
8	9,890	27,090	20,880	18,610	16,770	17,570	29,160	25,420	25,900	9,830	6,180	5,180
9	9,950	26,710	21,090	18,610	16,680	17,760	27,980	25,710	25,190	10,360	6,140	5,200
10	10,220	26,470	20,580	18,560	16,680	18,060	27,680	25,940	24,510	10,320	5,910	5,200
11	10,570	26,420	20,490	18,500	16,680	18,350	27,590	25,810	24,380	10,280	5,830	5,200
12	11,030	26,760	20,100	18,480	16,680	18,670	27,700	25,580	23,070	10,170	5,830	5,180
13	11,650	26,950	19,800	18,410	16,680	19.020	27,890	25,260	22,930	10,040	5,740	5,090
14	12,060	26,710	19,470	18,370	16,680	19,060	27,730	25,030	22,710	9,600	5,720	5,090
15	12,390	26,370	19,930	18,280	16,700	19,920	27,150	24,900	22,330	9,300	5,720	5,090
16	12,610	26,040	20,300	18,280	16,680	20,770	26,820	24,580	21,380	9,870	5,720	4,930
17	12,860	25,700	20,600	18,280	16,680	21,740	27,010	24,440	20,900	9,730	5,720	4,860
18	13,140	25,390	20,760	18,110	16,640	23,070	27,750	24,540	20,350	9,350	5,720	4,760
19	13,910	24,620	20,850	18,020	16,640	24,440	28,270	24,580	19,760	9,110	5,680	4,680
20	14,800	24,310	19,340	17,720	16,600	25,260	28,500	24,560	19,180	8,820	5,640	4,680
21	15,380	24,400	17,960	17,610	16,600	25,880	28,270	24,540	18,390	8,540	5,640	4,680
22	15,660	24,790	17,040	17,520	16,640	26,220	27,330	24,440	18,200	8,200	5,640	4,680
23	15,330	24,760	17,040	17,480	16,640	26,870	26,450	24,400	18,110	7,910	5,560	4,680
24	14,460	24,570	17,500	17,460	16,680	27,330	25,850	24,400	18,110	7,740	5,560	4,680
25	14,050	24,480	18,050	17,390	16,640	27,330	25,550	24,400	17,590	7,530	5,530	4,680
26	13,340	24,450	18,140	17,160	16,680	27,100	25,460	24,380	17,090	7,490	5,510	4,570
27	12,790	24,450	18,190	16,700	16,770	26,820	25,440	24,290	16,470	7,360	5,510	4,470
28	13,300	24,450	18,230	16,420	16,810	26,610	25,490	24,760	16,020	7,150	5,510	4,430
29	13,890	24,500	18,300	16,250	....	26,570	25,530	25,300	15,520	7,090	5,510	4,430
30	13,230	24,310	18,720	16,320	....	26,640	25,550	25,260	14,840	7,000	5,510	4,380
31	13,520	....	19,180	16,360	....	26,680	......	25,060	....	6,960	5,510	....

CLE ELUM RIVER NEAR ROSLYN, WASH.

Location.—In sec. 10, T. 20 N., R. 14 E., below temporary crib dam at outlet of Cle Elum Lake, 4 miles northwest of Roslyn, in Kittitas County, and 7½ miles northwest of Cle Elum.

Drainage area.—202 square miles (measured on topographic maps).

Records available.—October 10, 1903, to September 30, 1915.

Gage.—Stevens water-stage recorder, installed October 14, 1913 inspected daily by A. D. Nichols. Since May 17, 1906, vertical and inclined staff on left bank 800 feet below temporary crib dam. Prior to August 28, 1905, inclined gage at same site and datum as present gage. From August 28, 1905, to March 16, 1906, inclined staff at same site but at datum 0.56 foot higher than present gage. Gage height corrected to true datum.

Discharge measurements.—Made from cable about 350 feet below gage or by wading.

Channel and control.—Coarse gravel and boulders; shifting at high water. One channel at all stages.

Extremes of discharge.—Maximum stage during year from water-stage recorder, 6.75 feet at 1 p. m. April 3 (discharge, 4,220 second-feet); minimum stage from recorder, 0.54 foot at 10.30 a. m. October 10 (discharge, 41 second-feet).

1904–1915: Maximum stage recorded, 14.05 feet at 2 p. m. November 15, 1906 (discharge, 18,700 second-feet); minimum stage recorded, zero at 6 p. m. September 28, 1914 (discharge, practically zero).

Winter flow.—Stage-discharge relation not seriously affected by ice. Water from Cle Elum reservoir above freezing temperature.

Diversions.—None.

Regulation.—Flow partly controlled by storage and release of water at Cle Elum reservoir. Monthly discharge, without storage, determined from records of stage at reservoir.

Accuracy.—Rating curve well defined. Results excellent.

Cooperation.—Computed discharge and measurements furnished by United States Reclamation Service.

Discharge measurements of Cle Elum River near Roslyn, Wash., during the year ending Sept. 30, 1915.

Date.	Made by—	Gage height.	Discharge.	Date.	Made by—	Gage height.	Discharge.
		Feet.	*Sec.-ft.*			*Feet.*	*Sec.-ft.*
Oct. 8	Tuttle and Taylor	1.30	166	June 17	F. E. Moxley	3.04	806
Feb. 10	F. E. Moxley	1.24	129	July 3	.....do	2.86	706
Mar. 13	.....do	1.02	88	14	.....do	2.16	385
May 5	Parker and Taylor	3.22	902				

Daily discharge, in second-feet, of Cle Elum River near Roslyn, Wash., for the year ending Sept. 30, 1915.

Day.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.
1	98	183	1,000	216	130	130	1,220	1,060	950	732	307	211
2	111	188	950	216	130	132	2,650	1,000	895	706	300	206
3	123	225	923	216	130	134	4,030	1,000	678	706	291	195
4	137	830	868	213	130	132	3,670	1,060	385	706	285	190
5	147	1,630	840	211	130	130	2,860	950	555	706	279	188
6	155	1,840	785	208	130	132	2,300	895	706	706	276	181
7	161	1,620	416	203	128	134	2,050	978	813	680	273	176
8	161	1,360	200	203	130	136	1,950	1.150	966	483	267	181
9	165	1,180	211	203	130	113	1,780	1,280	1,060	381	264	183
10	92	1,060	442	203	130	94	1,660	1,390	868	385	259	181
11	61	1,060	598	203	130	94	1,540	1,360	840	385	253	171
12	90	1,220	564	203	130	94	1,620	1,250	840	385	250	166
13	114	1,280	506	203	130	168	1,700	1,120	706	385	247	164
14	136	1,150	294	203	130	291	1,780	1,030	647	385	247	160
15	188	1,000	174	203	130	273	1,990	950	813	385	242	153
16	215	868	174	203	130	291	1,580	895	807	389	242	146
17	220	758	176	203	130	279	1,550	868	813	385	239	138
18	261	929	176	200	130	226	1,880	868	813	389	242	134
19	333	895	323	200	130	201	2,100	895	813	389	245	134
20	403	895	628	198	130	385	2,200	895	813	385	242	136
21	467	950	706	198	130	608	2,100	868	758	385	245	134
22	507	1,000	680	198	130	840	2,000	868	560	385	242	134
23	662	1,000	396	198	130	1,120	1,580	813	560	385	242	132
24	783	950	211	196	130	1,360	1,280	813	564	349	239	130
25	733	923	206	193	130	1,390	1,150	813	603	323	239	130
26	733	923	206	190	130	1,250	1,120	813	654	329	239	126
27	708	923	206	272	130	1,090	1,090	813	680	326	236	124
28	359	923	211	303	130	1,000	1,090	895	706	329	231	120
29	314	923	218	216	....	978	1,120	1,000	706	329	226	120
30	593	895	218	128	....	1,000	1,120	1,060	732	329	221	113
31	583	....	216	126	....	1,030	....	1,000	....	319	213	....

NOTE.—Discharge ascertained from well-defined rating curves applicable Oct. 1 to Nov. 6, and Nov. 7 to Sept. 30.

Monthly discharge of Cle Elum River near Roslyn, Wash., for year ending Sept. 30, 1915.

[Drainage area, 202 square miles.]

Month.	Observed discharge (second-feet).			Run-off (total in acre-feet).			Discharge without storage (second-feet).		Run-off (depth in inches on drainage area).	Accuracy of observed discharge.
	Maximum.	Minimum.	Mean.	Observed.	Stored.	Without storage.	Mean.	Per square mile.		
October	783	61	317	19,500	+ 5,090	24,600	400	1.98	2.28	A.
November	1,840	183	986	58,700	+10,800	69,500	1,170	5.79	6.46	A.
December	1,000	174	443	27,200	− 5,130	22,100	359	1.78	2.05	A.
January	303	126	204	12,600	− 2,820	9,780	159	.79	.91	A.
February	130	128	130	7,210	+ 451	7,660	138	.68	.71	A.
March	1,390	94	491	30,200	+ 9,870	40,100	652	3.23	3.72	A.
April	4,030	1,090	1,860	110,000	− 1,130	109,000	1,830	9.06	10.11	A.
May	1,390	813	989	60,800	− 499	60,300	981	4.86	5.60	A.
June	1,060	385	743	44,200	−10,200	34,000	571	2.83	3.16	A.
July	732	319	446	27,400	− 7,870	19,500	317	1.57	1.81	A.
August	307	213	252	15,500	− 1,450	14,000	228	1.13	1.30	A.
September	211	113	155	9,240	− 1,130	8,110	136	.67	.75	A.
The year	4,030	61	585	423,000	− 4,020	419,000	579	2.87	38.86	

NACHES RIVER AT OAK FLAT, NEAR NILE, WASH.

Location.—In sec. 34, T. 15 N., R. 16 E., just above Oak Flat, three-fourths mile above intake of Selah Valley canal, 2 miles above Tieton River, and 8 miles southeast of Nile, in Yakima County.

Drainage area.—640 square miles (measured on topographic maps).

Records available.—June 25, 1904, to September 30, 1915.

Gage.—Stevens water-stage recorder after November 29, 1914. Barrett and Lawrence water-stage recorder September 20, 1911, to November 29, 1914. Water-stage recorder inspected daily during year by Lafe Little. Since September 22, 1914, inclined staff on left bank. Prior to flood of November 15, 1906, inclined staff on left bank 800 feet below present gage and at different datum. From November 16, 1906, to January 27, 1907, temporary inclined gage at same site, gage heights corrected to datum of original gage. From January 28, 1907, to April 12, 1909, vertical and inclined staff at same site and datum as original gage. From April 13, 1909, to September 14, 1914, cantilever chain gage at same site and datum as present gage.

Discharge measurements.—Made from cable 75 feet below gage or by wading.

Channel and control.—Gravel and boulders; steep gradient; shifting at medium and high water, One channel at all stages.

Extremes of discharge.—Maximum stage during year from water-stage recorder, 8.05 feet at 7 a. m. April 3 (discharge, 4,430 second-feet); minimum stage from recorder, 3.47 feet at 2 a. m. September 25 (discharge, 141 second-feet).

1904–1915: Maximum stage recorded, 10.3 feet during morning of November 15, 1906, water over gage, determined from high-water marks (discharge, 21,900 second feet); minimum stage recorded, 3.47 feet at 2 a. m. September 25, 1915 (discharge 141 second-feet).[1]

Winter flow.—Stage-discharge relation not seriously affected by ice; open-channel rating curve assumed applicable.

Diversions.—Numerous small tracts irrigated above station; aggregate depletion less than 5 per cent of flow.

Regulation.—Flow partly controlled by storage and release of water at Bumping reservoir. Monthly discharge, without storage, determined from records of stage at reservoir.

Accuracy.—Stage-discharge relation possibly slightly affected by ice for short periods in December and January. Results excellent for October, November, and February to May; good for remainder of year.

Cooperation.—Records of discharge and measurements furnished by United States Reclamation Service.

Discharge measurements of Naches River at Oak Flat, near Nile, Wash., during the year ending Sept. 30, 1915.

Date.	Made by—	Gage height.	Discharge.	Date.	Made by—	Gage height.	Discharge.
		Feet.	*Sec.-ft.*			*Feet.*	*Sec.-ft.*
Oct. 16	Taylor and Tuttle	4.24	353	June 2	F. E. Moxley	5.53	1,210
Nov. 30	F. E. Moxley	5.52	1,130	14	Moxley and Taylor	4.78	706
Feb. 1	.....do	4.13	276	Aug 7	F. E. Moxley	5.09	838
Mar. 19	.....do	4.97	721	Sept. 16	.....do	3.61	157
Apr. 9	.....do	6.69	2,320	27	R. S. Calland	3.47	146
May 10	Parker and Taylor	5.94	1,500				

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[1] Minimum stage, 3.0 feet, recorded Sept. 18–21, 1904, not considered reliable. Discharge, 139 second-feet, published p. 97, Water-Supply Paper 135, too small. Correct discharge Sept. 18–21, 1904, probably 180 second-feet.

Daily discharge, in second-feet, of Naches River at Oak Flat, near Nile, Wash., for the year ending Sept. 30, 1915.

Day.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.
1	297	256	1,120	344	277	243	1,710	1,160	1,160	470	619	271
2	289	753	1,080	344	269	250	3,490	1,200	1,200	459	656	263
3	280	2,480	1,040	335	265	261	4,340	1,240	1,160	465	735	235
4	280	1,660	978	318	254	285	3,900	1,120	1,200	503	854	221
5	183	1,370	962	301	246	297	3,330	1,080	1,160	486	797	198
6	163	1,160	917	335	246	297	3,030	1,080	1,120	399	847	167
7	157	962	902	293	221	297	2,750	1,200	1,040	399	891	149
8	157	887	887	269	214	301	2,540	1,330	980	353	950	141
8	280	814	843	277	218	322	2,350	1,510	861	357	913	167
10	360	843	743	269	211	335	2,280	1,510	783	486	491	173
11	351	858	637	269	201	339	2,350	1,370	729	571	439	176
12	360	1,020	611	261	197	344	2,410	1,280	702	600	418	188
13	369	1,040	551	261	208	344	2,480	1,160	722	631	366	182
14	379	1,120	551	269	184	399	2,280	1,080	715	576	349	182
15	369	1,080	675	261	178	689	2,220	978	702	547	357	170
16	341	1,160	611	232	225	872	2,220	902	847	600	362	161
17	389	1,080	551	246	225	771	2,410	978	936	553	362	161
18	408	1,120	551	246	214	757	2,680	1,040	729	542	357	164
19	608	917	540	239	211	729	2,820	1,060	676	542	349	161
20	645	993	551	232	211	716	2,890	1,030	631	565	344	158
21	608	1,370	517	191	225	814	2,160	993	619	619	344	149
22	560	1,280	517	153	225	1,020	1,710	925	619	600	335	141
23	428	1,240	599	153	225	1,330	1,510	887	619	576	335	144
24	369	1,370	599	211	235	1,460	1,370	880	613	644	335	144
25	360	1,200	495	147	258	1,410	1,280	850	588	670	335	141
26	389	1,200	394	153	258	1,370	1,200	843	600	676	327	147
27	379	1,240	394	293	246	1,330	1,200	880	576	702	331	149
28	379	1,330	443	246	246	1,330	1,200	1,160	530	696	331	149
29	289	1,200	394	301	....	1,330	1,280	1,120	508	742	319	149
30	264	1,120	394	301	....	1,460	1,240	1,200	486	676	298	149
31	341	....	348	285	....	1,460	....	1,160	....	644	310	......

NOTE.—Discharge Oct. 1 to Nov. 2 and Nov. 3 to June 1, ascertained from two well-defined rating curves; June 2 to Sept. 26, by method for shifting control; Sept. 27–30 from well-defined rating curve.

Monthly discharge of Naches River at Oak Flat, near Nile, Wash., for the year ending Sept. 30, 1915.

[Drainage area, 640 square miles.]

Month.	Observed discharge (second-feet).			Run-off (total in acre-feet).			Discharge without storage (second-feet).		Run-off (depth in inches on drainage area).	Accuracy of observed discharge.
	Maximum.	Minimum.	Mean.	Observed.	Stored.	Without storage.	Mean.	Per square mile.		
October	645	157	356	21,900	+ 1,860	23,800	387	0.605	0.70	A.
November	2,480	256	1,140	67,700	+ 9,430	77,100	1,290	2.02	2.25	A.
December	1,120	348	658	40,400	−11,500	28,900	470	.734	.85	B.
January	344	147	259	15,900	+ 1,230	17,100	278	.434	.50	B.
February	277	178	228	12,700	− 32	12,700	229	.358	.37	A.
March	1,460	243	747	45,900	+ 2,640	48,500	789	1.23	1.42	A.
April	4,340	1,200	2,290	136,000	+ 9,510	146,000	2,450	3.83	4.27	A.
May	1,510	843	1,100	67,900	+18,600	86,500	1,410	2.20	2.54	A.
June	1,200	486	794	47,200	+ 3,560	50,800	854	1.33	1.48	B.
July	742	353	560	34,400	−13,400	21,000	342	.534	.62	B.
August	950	298	486	29,900	−19,700	10,200	166	.259	.30	B.
September	271	141	172	10,200	− 1,740	8,500	143	.223	.25	B.
The year	4,340	141	732	530,000	+ 458	531,000	733	1.15	15.55	

BUMPING LAKE NEAR NILE, WASH.

Location.—Above storage dam at outlet of Bumping Lake, 12 miles above American River, and 19 miles west of Nile, in Yakima County.

Drainage area.—68 square miles (measured on topographic maps).

Records available.—April 27 to November 22, 1909; November 3, 1910, to September 30, 1915.

Gage.—Vertical staff on face of gate tower, datum mean sea level; read to hundredths twice daily by J. H. Nelson. Prior to November 3, 1910, vertical staff on north shore of lake, one-fourth mile above outlet; arbitrary datum.

Extremes of storage.—Maximum stage recorded during year, 3,428.28 feet July 9 (storage, 36,730 acre-feet); minimum stage recorded, 3,393.10 feet October 3 (storage, 985 acre-feet).

1911–1915: Maximum stage recorded, 3,428.28 feet July 9, 1915 (storage, 36,730 acre-feet); minimum stage recorded, 3,392.50 feet March 7, 1911 (storage, 775 acre-feet).

Storage.—Capacity of reservoir, at crest of spillway, 33,700 acre-feet. Elevation of gate sill and spillway crest, 3,389 feet and 3,426 feet, respectively. Storage or release each month used for determining discharge, without storage, for gaging station below dam.

Cooperation.—Storage table furnished by United States Reclamation Service.

Storage, in acre-feet, of Bumping Lake near Nile, Wash., for the year ending Sept. 30, 1915.

Day.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.
1	1,120	3,540	11,900	2,770	2,250	2,220	4,910	14,990	33,060	36,630	22,510	3,130
2	1,050	4,760	11,430	2,620	2,220	2,190	6,030	15,680	33,120	36,560	21,630	2,830
3	985	7,290	10,940	2,570	2,220	2,150	7,180	16,370	33,120	36,520	20,770	2,510
4	1,290	9,610	10,480	2,540	2,230	2,190	8,080	17,040	33,060	36,420	19,690	2,220
5	1,350	11,140	9,940	2,480	2,280	2,220	8,270	17,650	33,060	36,360	18,550	2,220
6	1,430	12,450	9,400	2,440	2,280	2,220	8,200	18,380	33,320	36,420	17,360	2,220
7	1,450	13,480	8,860	2,380	2,310	2,220	8,160	19,100	33,710	36,560	16,080	2,150
8	1,230	14,220	8,320	2,380	2,280	2,220	8,010	19,900	34,160	36,690	14,710	2,150
9	1,120	14,820	7,810	2,400	2,280	2,200	7,740	20,770	34,620	36,730	13,290	2,150
10	1,110	15,200	7,160	2,400	2,280	2,200	7,420	21,660	34,960	36,380	12,720	2,150
11	1,090	15,550	6,680	2,380	2,250	2,200	7,150	22,420	35,260	35,930	12,250	2,090
12	1,090	15,880	6,120	2,360	2,250	2,220	7,040	23,180	35,530	35,490	11,680	2,030
13	1,130	16,700	5,560	2,380	2,250	2,230	7,010	23,760	35,790	34,820	11,260	2,060
14	1,140	16,880	5,100	2,380	2,220	2,330	6,840	24,360	36,060	34,430	10,850	2,030
15	1,130	17,250	4,580	2,350	2,220	2,830	6,630	24,880	36,330	34,030	10,400	1,950
16	1,130	17,250	4,100	2,350	2,190	3,540	6,540	25,360	36,250	33,580	10,000	1,910
17	1,120	17,080	3,680	2,310	2,220	3,840	6,540	25,860	36,090	33,160	9,610	1,900
18	1,170	16,820	3,290	2,330	2,220	3,490	6,700	26,570	36,160	32,740	9,220	1,870
19	1,440	16,520	2,990	2,310	2,220	4,450	6,940	27,100	36,220	32,130	8,800	1,870
20	1,540	16,400	2,650	2,280	2,220	4,720	7,170	27,670	36,290	31,620	8,400	1,830
21	1,560	16,220	2,470	2,280	2,220	5,060	8,080	28,200	36,360	30,920	7,960	1,830
22	1,540	16,020	2,120	2,280	2,220	5,420	9,030	28,760	36,380	30,270	7,550	1,830
23	1,790	15,580	1,900	2,280	2,200	5,820	9,530	29,220	36,490	29,620	7,170	1,800
24	1,890	15,100	1,680	2,250	2,200	6,310	10,320	29,650	36,490	28,760	6,770	1,800
25	1,960	14,700	1,570	2,220	2,190	6,490	11,000	30,120	36,490	27,880	6,320	1,800
26	2,000	14,250	1,430	2,220	2,190	6,380	11,690	30,620	36,490	27,100	5,400	1,800
27	2,000	13,880	1,260	2,220	2,220	6,040	12,370	31,210	36,490	26,210	5,410	1,770
28	2,020	13,420	1,170	2,220	2,220	5,720	13,030	32,060	36,490	25,250	4,940	1,770
29	2,160	13,000	1,110	2,220	......	5,490	13,710	32,830	36,560	24,400	4,520	1,770
30	2,610	12,480	1,060	2,220	......	5,120	14,370	32,930	36,560	23,790	4,000	1,770
31	3,050	......	1,020	2,250	......	4,860	......	33,000	......	23,180	3,510	......

BUMPING RIVER NEAR NILE, WASH.

Location.—One-fourth mile below spillway of Bumping Lake dam, half a mile below outlet conduit through storage dam, 11½ miles above American River, and 19 miles west of Nile, in Yakima County.

Drainage area.—68 square miles (measured on topographic maps).

Records available.—June 13 to July 31, 1906; April 27, 1909, to September 30, 1915.

Gage.—Stevens water-stage recorder installed June 17, 1913, inspected daily by J. H. Nelson. Since June 17, 1913, vertical staff, on left bank, one-fourth mile below spillway of storage dam, reconstructed at same site and datum April 27, 1915. During 1906 vertical staff on left bank at dam site, half a mile above present gage and at different datum. April 27 to September 16, 1909, and June 26, 1912, to June 13, 1913, vertical staff near downstream end of right pier of highway bridge, about three-eighths mile above present gage and at different datum; readings on this gage April 27 to August 6, 1909, reduced to datum of succeeding gage by relation curve. Discharge over spillway crest, June 24 to July 30, 1912, determined and added to flow past gage. August 7, 1909, to June 25, 1912, vertical and inclined staff on right bank, about 1,300 feet above present gage and at different datum.

Discharge measurements.—Made from cable about 40 feet below gage or by wading.

Channel and control.—Large angular rocks and gravel; fairly permanent. Riffle control 60 feet below gage. Zero flow would occur at about gage height 0.6 foot.

Extremes of discharge.—Maximum stage during year from water-stage recorder, 4.12 feet at 9 a. m. August 8 (discharge, 932 second-feet); minimum stage from recorder, 1.03 feet October 4–6 (discharge, about 2 second-feet).

1906 and 1909–1915: Maximum stage recorded, 7.0 feet November 14, 1906 (discharge, 4,300 second-feet); minimum flow occurs frequently when gates in outlet conduit are closed (discharge, practically zero).

Winter flow.—Stage-discharge relation not seriously affected by ice; open-channel rating curve assumed applicable.

Diversions.—None.

Regulation.—Flow partly controlled by storage and release of water at Bumping reservoir. Monthly discharge, without storage, determined from records of stage at reservoir.

Accuracy.—Results good at low water and excellent at higher stages.

Cooperation.—Records of discharge and measurements furnished by United States Reclamation Service.

Discharge measurements of Bumping River near Nile, Wash., during the year ending Sept. 30, 1915.

Date.	Made by—	Gage height.	Discharge.	Date.	Made by—	Gage height.	Discharge.
		Feet.	*Sec.-ft.*			*Feet.*	*Sec.-ft.*
Oct. 14	Tuttle and Taylor	2.30	140	May 13	Parker and Moxley	1.44	20.4
Apr. 27	Moxley and Taylor	1.40	14.8	Oct. 8	Paul Taylor	1.71	42.7

Daily discharge, in second-feet, of Bumping River near Nile, Wash., for the year ending Sept. 30, 1915.

Day.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.
1	133	5	542	113	76	63	410	14	314	99	496	197
2	124	9	519	117	73	62	496	17	314	121	566	160
3	76	18	452	113	73	60	590	17	314	160	666	126
4	2	17	519	109	73	64	692	15	314	160	719	103
5	2	18	496	105	76	63	692	15	261	66	692	89
6	2	17	496	101	79	62	719	14	21	33	774	79
7	62	15	474	99	76	62	692	14	21	28	831	71
8	163	39	474	99	75	62	666	15	22	55	890	69
9	137	103	474	96	75	62	640	18	23	180	542	66
10	137	174	452	96	75	63	615	19	24	314	370	62
11	131	244	452	94	73	62	590	21	22	390	370	59
12	133	296	431	94	71	63	590	21	21	410	332	60
13	142	351	410	94	71	64	566	19	20	390	314	60
14	142	431	390	94	67	80	566	18	19	332	314	59
15	131	431	390	90	64	39	566	18	76	370	314	54
16	135	452	370	85	66	5	566	17	296	370	314	49
17	140	474	370	84	69	5	566	17	168	351	314	45
18	160	474	351	84	69	5	566	16	105	370	314	43
19	228	452	332	84	69	4	590	17	105	410	314	41
20	244	566	314	80	67	5	370	17	105	452	314	40
21	244	615	261	79	67	5	34	17	105	474	314	39
22	163	615	314	76	66	5	29	15	105	452	314	40
23	66	590	296	75	64	5	26	15	107	474	314	39
24	92	590	261	73	64	75	23	16	107	542	314	38
25	137	590	228	71	64	244	22	16	135	542	314	36
26	137	590	197	70	64	351	20	15	142	566	296	35
27	137	566	180	70	64	452	17	16	94	566	296	34
28	38	566	158	70	64	431	15	18	94	590	296	33
29	2	566	140	70	......	410	15	80	96	542	279	33
30	4	542	131	63	......	410	15	314	97	452	279	33
31	5	......	124	71	......	390	......	314	......	431	244	......

NOTE.—Discharge ascertained from rating curve fairly well defined from 25 to 125 second-feet; well defined above and poorly defined below those limits.

Monthly discharge of Bumping River near Nile, Wash., for year ending Sept. 30, 1915.

[Drainage area, 68 square miles.]

Month.	Observed discharge (second-feet).			Run-off (total in acre-feet).			Discharge without storage (second-feet).		Run-off (depth in inches on drainage area).	Accuracy of observed discharge.
	Maximum.	Minimum.	Mean.	Observed.	Stored.	Without storage.	Mean.	Per square mile.		
October	244	2	111	6,840	+ 1,860	8,700	141	2.07	2.39	B.
November	615	5	347	20,700	+ 9,430	30,100	506	7.44	8.30	A.
December	542	124	355	21,800	−11,500	10,300	168	2.47	2.85	A.
January	117	63	87.7	5,390	+ 1,230	6,620	108	1.59	1.83	B.
February	79	64	69.8	3,870	− 32	3,840	69.2	1.02	1.06	B.
March	452	4	120	7,400	+ 2,640	10,000	163	2.40	2.77	B.
April	719	15	399	23,700	+ 9,510	33,200	558	8.21	9.16	A.
May	314	14	37.9	2,330	+18,600	20,900	340	5.00	5.76	B.
June	314	19	122	7,230	+ 3,560	10,800	182	2.68	2.99	B.
July	590	28	345	21,200	−13,400	7,800	127	1.87	2.16	A.
August	890	244	420	25,800	−19,700	6,100	99.8	1.46	1.68	A.
September	197	33	63.1	3,750	− 1,740	2,010	33.8	.50	.56	B.
The year	890	2	207	150,000	+ 458	150,000	207	3.04	41.51	

AMERICAN RIVER NEAR NILE, WASH.

Location.—At highway bridge three-fourths mile above mouth, 17 miles northwest of Nile, in Yakima County.

Drainage area.—80 square miles (measured on topographic maps).

Records available.—April 25 to October 30, 1909; May 26 to November 15, 1910; May 18 to September 30, 1911; July 1 to September 30, 1913; June 26 to September 5, 1914; and June 30 to September 11, 1915.

Gage.—Vertical staff near downstream end of right bridge abutment; read to half-tenths daily by Purdy Crosno, except on days listed in footnote to table of daily discharge.

Discharge measurements.—Made from bridge at gage or by wading.

Channel and control.—Large boulders; steep gradient; shifts slightly at high water. One channel at all stages.

Extremes of discharge.—Maximum stage recorded during period, 2.22 feet at 11 a. m. June 30 (discharge, 186 second-feet); minimum stage recorded, 1.52 feet September 6–10 (discharge, 47 second-feet).

1909–1911 and 1913–1915: Maximum stage recorded,[1] 4.55 feet June 2, 1909 (discharge, 1,580 second-feet); minimum stage recorded, 1.60 feet October 16–19, 1909 (discharge, 45 second-feet).

Winter flow.—Station not maintained during frozen season.

Diversions.—None.

Regulation.—None.

Accuracy.—Results fair for July and poor for remainder of period.

Cooperation.—Gage-height record furnished by United States Forest Service, discharge computed by United States Reclamation Service.

Discharge measurements of American River near Nile, Wash., during the year ending Sept. 30, 1915.

Date.	Made by—	Gage height.	Discharge.
		Feet.	*Sec.-ft.*
Apr. 22	Moxley and Taylor	3.02	476
May 14	Parker and Moxley	2.65	338

Daily discharge of American River near Nile, Wash., for the year ending Sept. 30, 1915.

Day.	June.	July.	Aug.	Sept.	Day.	June.	July.	Aug.	Sept.
1		177	77	48	16		113	60	
2		168	77	49	17		113	59	
3		159	76	48	18		113	59	
4		154	75	48	19		113	57	
5		149	75	48	20		113	56	
6		145	74	47	21		113	54	
7		140	73	47	22		113	53	
8		135	73	47	23		113	52	
9		135	72	47	24		113	50	
10		135	71	47	25		113	52	
11		135	71	48	26		76	49	
12		113	70		27		78	50	
13		113	69		28		78	50	
14		113	69		29		78	50	
15		113	68		30	186	78	50	
					31		78	49	

Note.—Discharge ascertained from fairly well-defined rating curve. July 1, 2, 4–7, Aug. 1–11, 22, 29, and Sept. 5, gage not read; discharge interpolated.

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[1] Records available for only a few months each summer.

Monthly discharge, in second-feet, of American River near Nile, Wash., for the year ending Sept. 30, 1915.

Month.	Discharge in second-feet.			Run-off (total in acre-feet).	Accuracy.
	Maximum.	Minimum.	Mean.		
July	177	76	119	7,300	C.
August	77	49	62.9	3,860	D.
September	49	47	47.6	1,040	......
The period	....	....	....	12,200	

NORTH FORK OF TIETON RIVER BELOW CLEAR CREEK, NEAR NACHES, WASH.

Location.—In sec. 12, T. 13 N., R. 12 E. (unsurveyed), below Clear Creek dam of the United States Reclamation Service, a quarter of a mile below Clear Creek, a quarter of a mile above Cold Creek, and 7 miles above South Fork, about 30 miles southwest of Naches, in Yakima County.

Drainage area.—61 square miles (measured on topographic maps).

Records available.—May 5 to October 31, 1914; July 1 to September 19, 1915.

Gage.—Vertical staff on left bank 1,000 feet below Clear Creek dam; read to hundredths four times daily by O. B. Vaughn October 1–31, and twice daily by J. W. Douglas July 1 to September 19. Prior to May 21 gage at same site but at datum 0.68 foot higher; all gage heights reduced to present datum.

Discharge measurements.—Made from cable or by wading.

Channel and control.—Bed of stream at gage composed of solid rock. Control, about 100 feet below gage, is formed by rock ledge and should be permanent. Channel curves sharply to right a short distance below gage. Banks high but right bank is subject to overflow at gage height of about 10 feet. A log jam about 200 feet below gage may cause slight backwater effect at extremely high stages. One channel at all stages.

Extremes of discharge.—Maximum stage recorded for period, 2.00 feet from 6 to 10 a. m. July 3 (discharge, 310 second-feet); minimum stage, 0.88 foot at 6 a. m. July 16–17 (discharge, 126 second-feet).

1914–15, for period of record: Maximum stage recorded, 3.70 feet at 7.30 p. m. June 1, and 7 a. m. June 2, 1914 (discharge, 780 second-feet); minimum stage recorded, 0.62 foot at 2 p. m. and 7 p. m. September 13, 1914 (discharge, 106 second-feet).

Winter flow.—Observations discontinued during winter.

Diversions.—None.

Regulation.—Flow partly controlled by storage and release of water at Clear Creek reservoir. Monthly discharge, without storage, determined from records at reservoir.

Accuracy.—Results excellent, October 1–31; good, July 1 to September 19.

Cooperation.—Records of discharge and measurements furnished by United States Reclamation Service.

Discharge measurements of North Fork of Tieton River below Clear Creek, near Naches. Wash., during the year ending Sept. 30, 1915.

Date.	Made by—	Gage height.	Discharge.
		Feet.	*Sec.-ft.*
Aug. 3	Moxley and Calland	1.41	204
Sept. 10	F. E. Moxley	1.14	168

Daily discharge, in second-feet, of North Fork of Tieton River below Clear Creek, near Naches, Wash., for the periods Oct. 1-31, 1914, and July 1 to Sept. 19, 1915.

Day.	Oct.	July.	Aug.	Sept.	Day.	Oct.	July.	Aug.	Sept.
1	135	264	246	203	16	178	126	237	165
2	178	282	220	172	17	218	150	228	165
3	131	291	263	157	18	218	157	180	203
4	128	282	246	157	19	263	157	165	203
5	132	273	195	157	20	245	220	157	....
6	129	273	165	157	21	202	228	187	....
7	129	237	211	157	22	186	237	264	....
8	129	264	237	157	23	170	211	246	....
9	123	246	220	172	24	163	195	220	....
10	163	180	195	165	25	163	195	195	....
11	170	187	180	165	26	163	195	195	....
12	218	195	172	172	27	156	203	195	....
13	227	195	180	165	28	156	195	195	....
14	227	187	195	165	29	156	180	195	....
15	186	150	237	165	30	210	157	195	....
					31	260	203	237	....

NOTE.—Discharge Oct. 1-30 ascertained from well-defined rating curve; July 1 to Sept. 19, from fairly well defined rating curve. Oct. 31 gage not read; discharge estimated by comparison with Tieton River at headworks of Tieton canal.

Monthly discharge of North Fork of Tieton River below Clear Creek, near Naches, Wash., for the periods Oct. 1 to 31, 1914, and July 1 to Sept. 19, 1915.

[Drainage area, 60 square miles.]

Month.	Observed discharge (second-feet).			Run-off (total in acre-feet).			Discharge without storage (second-feet).		Run-off (depth in inches on drainage area).	Accuracy of observed discharge.
	Maximum.	Minimum.	Mean.	Observed.	Stored.	Without storage.	Mean.	Per square mile.		
October	263	123	178	10,900	0	10,900	178	2.92	3.37	A.
July	291	126	210	12,900	− 113	12,800	208	3.41	3.93	B.
August	264	157	206	12,700	− 82	12,600	205	3.36	3.87	B.
September 1-19	203	157	170	6,380	−1,600	4,780	127	2.08	1.47	B.

TIETON RIVER AT HEADWORKS OF TIETON CANAL, NEAR NACHES, WASH.

LOCATION.—In sec. 30, T. 14 N., R. 15 E. (unsurveyed), below intake of Tieton canal, 15 miles above mouth, and about 16 miles southwest of Naches, in Yakima County.

DRAINAGE AREA.—240 square miles (measured on topographic maps).

RECORDS AVAILABLE.—April 17 to September 17, 1906, fragmentary gage heights; July 5, 1907, to September 30, 1915.

GAGE.—Friez water-stage recorder installed July 8, 1911; inspected twice daily during irrigation season and once or twice weekly during winter by employees of United States Reclamation Service. From July 5 to October 26, 1907, August 26 to December 12, 1908, and since April 9, 1909, vertical staff on right bank about 1,000 feet below intake of Tieton canal; reconstructed November 2, 1912, and August 28, 1914; all published gage heights at approximately the same datum. Bristol water-stage recorder in use July 28, 1909, to July 7, 1911. From April 17 to September 17, 1906, vertical staff on left bank about three-fourths mile below present gage. From October 27, 1907, to April 8, 1909, cantilever arm and graduated sticks for measuring down to water surface at Weisberger's power plant about 1½ miles below present gage. Gage heights January 1 to April 8, 1909, referred to datum of present gage by curve of relation. Records at all sites comparable.

Discharge measurements.—Made from cable, about 500 feet below gage or by wading.

Channel and control.—Gravel and boulders; steep gradient; shifts slightly at high water. One channel at all stages.

Extremes of discharge.—Maximum stage during year from water-stage recorder, 4.92 feet at 2 a. m. April 3 (discharge, 1,550 second-feet); minimum stage from recorder, 1.30 feet at 8 p. m. July 15 (discharge, 19 second-feet).

1907–1915: Maximum stage from water-stage recorder, 7.15 feet at 4 a. m. November 24, 1909 (discharge, approximately 5,400 second-feet); minimum stage from recorder, 1.30 feet at 8 p. m. July 15, 1915 (discharge, 19 second-feet).

Winter flow.—Stage-discharge relation seriously affected by ice; flow determined from discharge measurement and records of temperature.

Diversion.—Tieton canal has diverted water above the gage since 1910. Diversion through canal added to mean monthly flow to determine natural monthly discharge.

Regulation.—Flow slightly regulated by storage and release of water at Clear Creek reservoir about 15 miles above gage. Purpose of regulation to obviate diurnal fluctuation during irrigation season.

Accuracy.—Stage-discharge relation probably changed November 3; date of change doubtful.

Cooperation.—Records of discharge and measurements furnished by United States Reclamation Service.

Discharge measurements of Tieton River at headworks of Tieton canal, near Naches, Wash., during the year ending Sept. 30, 1915.

Date.	Made by—	Gage height.	Discharge.	Date.	Made by—	Gage height.	Discharge.
		Feet.	*Sec.-ft.*			*Feet.*	*Sec.-ft.*
Oct. 1	Taylor and Tuttle	2.85	255	June 29	Moxley and Taylor	2.38	124
Feb. 4	F. E. Moxley	[a]2.56	160	Aug. 4	Moxley and Calland	2.36	113
May 20	Moxley and Greer	3.13	350	4	Calland and Moxley	2.29	107
11	Taylor and Parker	3.49	533				

[a] Stage-discharge relation affected by ice.

Daily discharge, in second-feet, of Tieton River at headworks of Tieton canal, near Naches, Wash., for the year ending Sept. 30, 1915.

Day.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.
1	241	505	333	198	162	173	631	482	467	203	121	74
2	254	622	333	198	165	176	1,440	527	384	230	114	62
3	260	1,090	326	198	168	181	1,400	497	326	261	93	45
4	244	842	311	195	159	195	1,100	406	318	294	112	48
5	241	762	304	195	170	195	945	368	372	458	100	57
6	244	696	301	192	168	192	842	372	434	286	66	52
7	244	644	290	187	168	195	798	434	482	224	97	51
8	244	598	280	184	168	198	756	527	380	195	121	54
9	235	554	270	181	168	201	696	615	277	198	102	112
10	282	512	253	181	168	203	661	610	233	95	71	149
11	278	296	235	184	162	206	702	502	195	70	59	127
12	320	266	218	187	162	206	762	453	203	69	56	171
13	400	644	192	184	170	206	762	411	215	68	56	159
14	356	649	168	181	154	264	655	364	236	61	145	157
15	328	533	181	181	157	389	604	326	255	37	246	159
16	309	477	168	165	154	376	638	294	273	25	97	159
17	332	438	154	165	154	364	702	373	287	31	84	168
18	332	352	154	165	154	376	792	467	245	37	50	196
19	420	287	168	162	168	360	842	448	178	30	41	277
20	405	389	168	162	168	352	842	411	141	74	36	230
21	360	467	170	159	168	384	690	380	141	99	106	224
22	328	393	173	154	168	446	565	364	154	110	287	215
23	306	356	176	151	168	538	472	340	195	105	103	203
24	295	340	178	146	176	538	420	333	215	73	92	184
25	292	336	181	144	178	482	393	329	146	68	65	206
26	289	336	184	141	176	434	368	311	103	74	58	201
27	289	336	187	141	176	398	360	428	79	76	58	195
28	285	364	189	154	173	402	380	810	68	65	165	173
29	285	360	189	157	....	415	448	593	104	54	209	176
30	320	340	192	159	....	434	708	472	164	62	89	181
31	400	....	195	162	....	415	....	434	....	82	105	....

NOTE.—Discharge Oct. 1 to Nov. 3 ascertained from fairly well defined rating curve; Nov. 4 to Sept. 30, from rating curve well defined from 120 to 400 second-feet and fairly well defined above and below those limits. Stage-discharge relation affected by ice during winter, discharge estimated from records of temperature Dec. 13 to Jan. 1, Jan. 18 to Feb. 4, Feb. 16 to 18.

Combined monthly discharge of Tieton River and canal at headworks of Tieton canal, near Naches, Wash., for the year ending Sept. 30, 1915.

[Drainage area, 240 square miles.]

Month.	Discharge in second-feet.						Combined run-off.		Accuracy.
	Combined.		River (mean).	Canal (mean).	Total.		Depth in inches on drainage area.	Total in acre-feet.	
	Maximum.	Minimum.			Mean.	Per square mile.			
October	420	235	304	0.0	304	1.27	1.46	18,700	B.
November	1,180	266	493	34.1	527	2.20	2.46	31,400	B.
December	333	154	220	.0	220	.917	1.06	13,500	C.
January	198	141	171	.0	171	.713	.82	10,500	C.
February	178	154	166	.0	166	.692	.72	9,220	B.
March	538	173	319	.0	319	1.33	1.53	19,600	A.
April	1,440	598	712	90.2	802	3.34	3.73	47,700	B.
May	995	496	441	199	640	2.67	3.08	39,400	B.
June	702	340	242	244	486	2.02	2.25	28,900	A.
July	566	300	123	257	380	1.58	1.82	23,400	A.
August	415	209	103	221	324	1.35	1.56	19,900	B.
September	295	154	149	83.9	233	.971	1.08	13,900	B.
The year	1,440	141	287	95.0	382	1.59	21.57	276,000	

TIETON CANAL NEAR NACHES, WASH.

Location.—In sec. 30, T. 14 N., R. 15 E. (unsurveyed), below canal intake and about 16 miles southwest of Naches, in Yakima County.

Records available.—Irrigation seasons, 1910 to 1915.

Gage.—Float gage installed in a stilling well about 500 feet below canal intake; read to hundredths twice daily by G. G. Girdner.

Discharge measurements.—Made from a gaging bridge 30 feet below gage or by wading.

Channel and control.—Earth section merging into concrete-lined section 1,000 feet below gage. Stage-discharge relation practically permanent, except for influence of brush and weeds growing on sides of earth section.

Extremes of discharge.—Maximum stage recorded during year and also for irrigation seasons 1910–1915, 4.46 feet June 30 and July 1, 1914, July 13–19, 1915 (discharge, 275 second-feet);, no water in canal, during year, from October 1 to November 17, November 29 to April 11, and September 19–30.

Accuracy.—Results excellent.

Cooperation.—Records of discharge and measurements furnished by United States Reclamation Service.

Discharge measurements of Tieton canal near Naches, Wash., during the year ending Sept. 30, 1915.

Date.	Made by—	Gage height.	Discharge.	Date.	Made by—	Gage height.	Discharge.
		Feet.	*Sec.-ft.*			*Feet.*	*Sec.-ft.*
May 11	Parker and Taylor.....	3.93	230	June 23	A. Philpott............	4.25	253
18	A. Philpott............	3.75	216	Aug. 4	Moxley and Cailand....	4.13	253

Daily discharge, in second-feet, of Tieton canal near Naches, Wash., for the year ending Sept. 30, 1915.

Day.	Nov.	Apr.	May.	June.	July.	Aug.	Sept.
1	....	....	100	196	272	250	220
2	....	....	103	200	272	250	210
3	....	....	118	207	272	250	210
4	....	....	161	209	272	250	210
5	....	....	188	209	0	239	195
6	....	....	210	216	246	230	190
7	....	....	230	220	254	230	182
8	....	....	234	242	254	230	100
9	....	....	234	242	263	236	100
10	....	....	234	242	270	245	100
11	....	....	234	246	270	250	100
12	....	7	234	246	272	250	100
13	....	15	234	246	275	250	100
14	....	76	234	246	275	250	100
15	....	100	234	246	275	0	100
16	....	101	234	246	275	250	100
17	....	101	233	246	275	250	100
18	93	102	215	250	275	250	100
19	93	104	203	252	275	250	....
20	93	121	203	252	270	250	....
21	93	142	203	254	270	250	....
22	93	171	203	258	270	0	....
23	93	198	203	258	260	250	....
24	93	204	190	266	260	250	....
25	93	226	185	270	260	250	....
26	93	232	185	270	260	250	....
27	93	238	185	272	260	250	....
28	93	238	185	272	260	250	....
29	....	238	185	272	260	0	....
30	....	93	185	272	260	221	....
31	....	....	185	....	250	221	....

Note.—Discharge ascertained from rating curve well defined above 75 second-feet.

Monthly discharge of Tieton canal near Naches, Wash., for the year ending Sept. 30, 1915.

Month.	Discharge in second-feet.			Run-off (total in acre-feet).	Accuracy.
	Maximum.	Minimum.	Mean.		
November 18-28	93	93	93	2,030	A.
April 12-30	238	7	142	5,370	A.
May	234	100	199	12,200	A.
June	272	196	244	14,500	A.
July	275	0	257	15,800	A.
August	250	0	221	13,600	A.
September 1-18	220	100	140	4,990	A.

NOTE.—No flow in canal Oct. 1 to Nov. 17, Nov. 29 to Apr. 11, and Sept. 19-30.

NORTH FORK OF AHTANUM CREEK NEAR TAMPICO, WASH.

LOCATION.—In the NW. ¼ sec. 2, T. 12 N., R. 15 E., at George Prior's ranch, about 100 feet below Nasty Creek, and about 3½ miles northwest of Tampico, in Yakima County.

DRAINAGE AREA.—69 square miles, measured on topographic maps.

RECORDS AVAILABLE.—August 26, 1907, to September 30, 1915.

GAGE.—Stevens water-stage recorder installed April 2, 1913, on left bank about 300 feet southeast of ranch house; inspected once a week by F. W. Schott. Prior to April 2, 1913, vertical staff at same site and datum as present gage. Water-stage recorder used until August 19, 1915.

DISCHARGE MEASUREMENTS.—Made from gaging bridge 50 feet below gage or by wading.

CHANNEL AND CONTROL.—Gravel and boulders; shifting at high stages. Banks high; not subject to overflow. One channel at all stages. Riffle control 100 feet below gage.

EXTREMES OF DISCHARGE.—Maximum stage during year from water-stage recorder, 3.0 feet at 10 p. m. April 2 (discharge, 272 second-feet); minimum stage recorded, 1.41 feet September 5 (discharge, 14 second-feet).

1907-1915: Maximum stage recorded, 3.3 feet March 2, 1910 (discharge, 684 second-feet); minimum stage recorded, 1.32 feet at 3 p. m. December 25, 1914 (discharge, 11.8 second-feet).

WINTER FLOW.—Stage-discharge relation probably not affected by ice; open-channel rating curve assumed applicable.

DIVERSIONS.—Above all diversions.

REGULATION.—None.

ACCURACY.—Results excellent, except when recorder was not operating in August and September. Staff-gage record fragmentary. Practically no diurnal fluctuation.

Discharge measurements of North Fork of Ahtanum Creek near Tampico, Wash., during the year ending September 30, 1915.

Date.	Made by—	Gage height.	Discharge.	Date.	Made by—	Gage height.	Discharge.
		Feet.	*Sec.-ft.*			*Feet.*	*Sec.-ft.*
Mar. 14	G. L. Parker	1.90	56.9	May 7	C. G. Paulsen	2.35	132
Apr. 22	C. G. Paulsen	2.50	159	July 12	.....do	1.66	29.6
May 7	.....do	2.36	131	Aug. 12	.....do	1.51	19.5

Daily discharge, in second-feet, of North Fork of Ahtanum Creek near Tampico, Wash., for the year ending September 30, 1915.

Day.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.
1	22	37	32	28	27	22	146	130	122	39	24	16
2	24	49	35	27	26	23	239	136	118	37	23	17
3	24	52	33	28	24	23	244	144	116	36	22	16
4	23	83	34	28	23	27	206	120	116	36	22	15
5	22	64	34	27	21	29	184	118	124	36	22	14
6	22	52	28	25	20	28	171	124	126	36	21	15
7	27	48	32	24	20	28	167	140	118	37	21	16
8	23	41	27	24	20	30	154	152	113	38	21	16
9	22	39	27	24	20	31	142	178	102	37	21	16
10	23	39	22	24	20	32	142	169	99	35	20	16
11	21	39	22	24	20	35	150	154	94	33	20	16
12	20	38	23	23	21	37	162	146	92	31	19	17
13	19	38	32	24	20	38	158	142	86	30	19	18
14	19	38	49	23	24	53	150	132	82	31	18	18
15	19	29	62	23	34	74	150	122	78	30	18	17
16	24	39	59	28	23	83	160	118	78	29	18	16
17	21	37	54	22	21	84	180	136	76	28	19	16
18	19	34	61	23	20	86	204	138	71	27	18	16
19	19	35	59	33	20	83	217	134	67	27	18	16
20	18	45	51	23	20	84	208	130	60	26	18	16
21	20	47	47	28	20	94	184	126	54	24	17	16
22	22	44	42	51	20	111	164	124	53	23	17	16
23	25	41	39	26	20	140	150	122	54	23	16	16
24	27	39	36	78	21	136	140	116	52	22	16	15
25	28	40	32	136	22	113	134	113	52	22	16	15
26	28	38	32	110	21	97	134	111	49	24	16	15
27	30	38	31	84	20	86	134	126	48	23	17	15
28	30	37	30	57	21	88	138	134	44	24	17	15
29	30	35	28	31	......	96	152	128	42	27	16	15
30	30	34	27	30	......	100	136	122	40	33	16	15
31	32	......	28	29	......	100	......	120	......	27	16	......

NOTE.—Discharge ascertained from two well-defined rating curves applicable Oct. 1 to Jan. 25, and Jan. 29 to Sept. 30. Oct. 21-23, Nov. 10-13, Jan. 26-28, 30-31, Feb. 1-5, Aug. 5, 6, 8, and 10, water stage recorder stopped; discharge interpolated. Aug. 20 to Sept. 30, water below intake; outside gage at same datum read three times a week; discharge interpolated for days when gage was not read.

Monthly discharge of North Fork of Ahtanum Creek near Tampico, Wash., for the year ending September 30, 1915.

Month.	Discharge in second-feet.			Run-off (total in acre-feet).	Accuracy.
	Maximum.	Minimum.	Mean.		
October	32	18	23.6	1,450	A.
November	83	29	42.3	2,520	A.
December	62	22	37.0	2,280	A.
January	136	22	37.6	2,310	A.
February	34	20	21.8	1,210	A.
March	140	22	67.5	4,150	A.
April	244	134	167	9,940	A.
May	178	111	132	8,120	A.
June	126	[a] 40	80.9	4,810	A.
July	[a] 39	22	30.0	1,840	A.
August	24	16	18.8	1,160	A.
September	18	14	15.9	946	A.
The year	244	14	56.3	40,700	

[a] Interpolated value.

SOUTH FORK OF AHTANUM CREEK AT CONRAD RANCH, NEAR TAMPICO, WASH.

LOCATION.—In the W. ½ sec. 23, T. 12 N., R. 15 E., at Conrad ranch, 2½ miles above the North Fork, and 2¾ miles southwest of Tampico, in Yakima County.

DRAINAGE AREA.—26 square miles (measured on topographic maps).

RECORDS AVAILABLE.—March 15 to September 30, 1915.

GAGE.—Vertical staff on left bank about 75 feet from observer's house; read twice daily to hundredths by Mrs. W. B. Conrad.

DISCHARGE MEASUREMENTS.—Made by wading.

CHANNEL AND CONTROL.—Gravel and sand; shifting at high stages. One channel at all stages. Banks high and wooded. Zero flow would occur at zero gage height ±0.2 foot, as determined March 16, 1915.

EXTREMES OF DISCHARGE.—Maximum stage recorded during year, 1.50 feet at 6 p. m. April 3 (discharge, 62 second-feet); minimum stage recorded, 0.60 foot September 25–26 (discharge, 4.3 second-feet).

WINTER FLOW.—Station discontinued during winter.

DIVERSIONS.—Small ditch diverting above gage supplies water to Conrad's hop fields.

REGULATION.—None.

ACCURACY.—Results fair for March and excellent for remainder of year, except for extremely low stage.

Discharge measurements of South Fork of Ahtanum Creek at Conrad ranch, near Tampico, Wash., during the year ending September 30, 1915.

Date.	Made by—	Gage height.	Discharge.	Date.	Made by—	Gage height.	Discharge.
		Feet.	*Sec.-ft.*			*Feet.*	*Sec.-ft.*
Mar. 16	G. L. Parker	1.18	33.1	July 13	C. G. Paulsen	.72	9.66
Apr. 23	C. G. Paulsen	1.23	41.0	13	.....do	.72	9.44
May 6	.....do	1.07	31.0	Aug. 12	.....do	.66	6.61

Daily discharge, in second-feet, of South Fork of Ahtanum Creek at Conrad ranch, near Tampico, Wash., for the year ending Sept. 30, 1915.

Day.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.
1	....	39	33	25	11	8.1	6.0
2	....	58	33	25	10	8.1	6.0
3	....	62	32	24	10	7.7	5.6
4	....	54	31	24	10	7.7	5.6
5	....	50	31	23	10	7.7	5.6
6	....	46	31	23	11	6.8	5.1
7	....	43	31	22	10	6.8	5.1
8	....	42	32	21	10	7.2	5.1
9	....	38	33	21	10	7.2	4.7
10	....	38	35	21	10	6.8	5.1
11	....	39	36	20	10	6.8	5.1
12	....	39	36	20	9.5	6.8	5.1
13	....	41	36	20	9.5	6.8	5.6
14	....	41	33	19	9.5	6.8	5.1
15	39	39	31	18	9.5	6.8	5.1
16	38	42	31	16	9.5	6.8	5.1
17	38	44	33	16	9.5	6.8	5.1
18	38	46	33	15	9.5	6.8	5.1
19	36	49	32	15	9.0	6.8	5.1
20	36	52	32	15	8.5	6.8	4.7
21	38	48	31	14	7.7	6.0	5.1
22	40	44	26	13	7.7	6.0	5.1
23	46	40	26	13	7.7	6.0	5.1
24	46	38	26	13	7.7	6.0	5.1
25	40	36	29	13	7.7	6.0	4.3
26	35	35	28	12	7.2	6.0	4.3
27	31	33	28	12	6.8	5.6	5.1
28	32	35	28	11	7.2	5.6	5.1
29	33	35	28	11	7.7	5.6	5.1
30	35	36	27	11	10	5.6	5.1
31	35	....	26	....	9.5	5.1	....

NOTE.—Discharge ascertained from rating curve well defined below 50 second-feet.

Monthly discharge of South Fork of Ahtanum Creek at Conrad ranch, near Tampico, Wash., for the year ending Sept. 30, 1915.

Month.	Discharge in second-feet.			Run-off (total in acre-feet).	Accuracy.
	Maximum.	Minimum.	Mean.		
March 15-31	46	31	37.4	1,260	C.
April	62	33	42.7	2,540	A.
May	36	26	30.9	1,900	A.
June	25	11	17.5	1,040	A.
July	11	6.8	9.13	561	A.
August	8.1	5.1	6.63	408	B.
September	6.0	4.3	5.15	306	B.
The period				8,020	

NEW RESERVATION CANAL NEAR PARKER, WASH.

Location.—In sec. 20, T. 12 N., R. 19 E., three-fourths mile below intake of canal, three-fourths mile northwest of Parker, in Yakima County, and 5½ miles northwest of Wapato.

Records available.—Irrigation seasons 1904–1915.

Gage.—Vertical staff on left side three-fourths mile below intake, read to hundredths twice daily by George M. Baugher. Prior to April 1, 1911, vertical staff on upstream side, left abutment of highway bridge, one-fourth mile below present gage and at different datum.

Discharge measurements.—Made from bridge at gage and from highway bridge one-fourth mile below gage.

Channel and control.—Gravel and small stones. Growth of aquatic plants causes variable obstruction in channel. Operation of checks below gage renders control unstable.

Extremes of discharge.—Maximum stage recorded during year, 4.31 feet May 12–14 (discharge, 672 second-feet); no water in canal October 15 to April 6.

1904–1915: Maximum stage recorded, 4.31 feet May 12–14, 1915 (discharge, 672 second-feet); no water in canal during nonirrigating seasons.

Accuracy.—Stage-discharge relation seriously affected by growth of aquatic plants and by operation of checks below gage. Frequent measurements render results good.

Cooperation.—Computed discharge furnished by United States Reclamation Service. Measurements furnished by United States Office of Indian Affairs and United States Reclamation Service.

Discharge measurements of New Reservation canal near Parker, Wash., during the year ending Sept. 30, 1915.

Date.		Made by—	Gage height.	Discharge.	Date.		Made by—	Gage height.	Discharge.
			Feet.	*Sec.-ft.*				*Feet.*	*Sec.-ft.*
Oct.	13	R. S. Skillin	0.78	60	July	20	R. S. Skillin	3.60	461
	14	.....do	2.46	252		26	.....do	3.18	363
May	3	.....do	4.08	608	Aug.	2	.....do	3.35	384
	10	.....do	4.18	644		6	F. E. Moxley	3.37	381
	17	.....do	3.85	560		9	R. S. Skillin	3.47	406
	18	Parker and Taylor	3.68	523		11	.....do	3.67	447
	26	R. S. Skillin	3.98	600		16	.....do	2.99	333
June	3	.....do	3.79	539		17	.....do	.62	46
	3	F. E. Moxley	3.76	543		20	.....do	.60	44
	7	R. S. Skillin	3.76	531		20	F. E. Moxley	.61	45
	12	F. E. Moxley	3.99	588		25	R. S. Skillin	3.76	482
	14	R. S. Skillin	4.18	608		28	.....do	3.50	450
	17	.....do	3.78	504		30	.....do	.37	34
	18	.....do	3.78	505	Sept.	7	.....do	.30	30
	19	F. E. Moxley	3.94	532		7	F. E. Moxley	.27	29
	23	R. S. Skillin	4.03	559		8	R. S. Skillin	2.10	222
	29	.....do	4.00	529		14	.....do	1.09	94
July	1	F. E. Moxley	3.98	527		15	.....do	1.57	144
	8	R. S. Skillin	4.26	599		17	F. E. Moxley	1.54	139
	12	.....do	3.60	462		21	R. S. Skillin	1.53	143
	12	F. E. Moxley	3.60	448		27	.....do	2.12	218

Daily discharge, in second-feet, of New Reservation canal near Parker, Wash., for the year ending Sept. 30, 1915.

Day.	Oct.	Apr.	May.	June.	July.	Aug.	Sept.
1	173	....	584	491	531	383	33
2	177	....	582	498	531	373	33
3	169	....	609	536	533	365	32
4	167	....	615	529	533	365	30
5	158	....	615	519	531	365	30
6	154	....	615	527	531	387	29
7	154	36	620	529	567	393	29
8	154	48	628	527	607	419	215
9	154	77	647	510	563	409	206
10	157	123	647	557	460	419	212
11	154	130	647	561	456	466	210
12	154	156	672	573	456	492	206
13	189	118	672	594	456	477	83
14	71	143	672	596	487	435	96
15	....	222	653	612	519	385	145
16	....	257	573	628	487	335	143
17	....	311	538	542	519	173	139
18	....	319	529	500	460	46	136
19	....	359	617	536	458	44	136
20	....	431	615	544	460	44	141
21	....	447	592	419	460	44	141
22	....	473	599	525	439	45	143
23	....	502	590	554	419	45	141
24	....	508	617	552	419	496	141
25	....	510	594	552	407	481	140
26	....	569	578	552	367	458	134
27	....	582	546	552	377	441	118
28	....	582	502	552	377	454	118
29	....	588	498	531	397	454	117
30	....	586	500	533	363	34	117
31	....	....	498	....	373	34	....

NOTE.—Discharge ascertained by method for shifting control. June 15, gage washed out; discharge estimated. Aug. 31 to Sept. 6, no gage-height record; discharge interpolated.

Monthly discharge of New Reservation canal near Parker, Wash., for the year ending Sept. 30, 1915.

Month.	Discharge in second-feet.			Run-off (total in acre-feet).	Accuracy.
	Maximum.	Minimum.	Mean.		
October 1-14	189	71	156	4,330	B.
April 7-30	588	36	337	16,000	B.
May	672	498	596	36,600	B.
June	628	419	541	32,200	B.
July	607	363	469	28,800	B.
August	496	34	315	19,400	B.
September	215	29	120	7,130	B.

OLD RESERVATION CANAL NEAR PARKER, WASH.

Location.—In sec. 28, T. 12 N., R. 19 E., about 300 feet below intake, 500 feet above controlling waste of first lateral, 1 mile east of Parker, in Yakima County, and 3½ miles northwest of Wapato.

Records available.—Irrigation seasons 1904–1915.

Gage.—Vertical staff on left side about 10 feet upstream from private farm bridge; read to hundredths twice daily by Frank Sutton. Prior to June 23, 1908, vertical staff on downstream end, right retaining wall of Northern Pacific Railway Co. bridge, about half a mile below present gage and at different datum.

Discharge measurements.—Made from gaging bridge at gage.

Channel and control.—In bed of old slough; velocities high; no obstruction from growth of aquatic plants; fairly permanent for each irrigation season.

Extremes of discharge.—Maximum stage recorded during year, 3.71 feet May 11 (discharge, 277 second-feet); no water in canal October 15 to March 31.

1904–1915: Maximum stage recorded, 4.20 feet June 17, 1914 (discharge, 332 second-feet). No water diverted during nonirrigating seasons.

Accuracy.—Rating curve well defined between 15 and 300 second-feet. Operation of checks below gage may influence stage-discharge relation slightly. Results excellent above and good below 100 second-feet except for extremely low water.

Cooperation.—Records of discharge furnished by United States Reclamation Service. Measurements furnished by United States Office of Indian Affairs and United States Reclamation Service.

Discharge measurements of Old Reservation canal near Parker, Wash., during the year ending Sept. 30, 1915.

Date.	Made by—	Gage height.	Discharge.	Date.	Made by—	Gage height.	Discharge.
		Feet.	*Sec.-ft.*			*Feet.*	*Sec.-ft.*
Oct. 13	R. S. Skillin	0.95	58	July 8	R. S. Skillin	2.47	172
May 3	.....do	3.48	257	12	.....do	2.00	131
10	.....do	3.70	276	12	F. E. Moxley	2.00	126
17	.....do	3.21	237	20	R. S. Skillin	1.89	130
17	Parker and Taylor	3.21	227	22	.....do	1.92	131
25	R. S. Skillin	2.99	219	26	.....do	1.86	119
June 3	.....do	2.79	196	Aug. 2	.....do	1.84	116
3	F. E. Moxley	2.83	206	6	F. E. Moxley	1.65	101
7	R. S. Skillin	2.30	155	11	R. S. Skillin	0.59	37
12	F. E. Moxley	1.97	127	17	.....do	−0.05	11
14	R. S. Skillin	1.91	126	20	.....do	−0.12	10
19	F. E. Moxley	2.21	146	20	F. E. Moxley	−0.11	8.0
23	R. S. Skillin	2.01	130	30	R. S. Skillin	−0.11	13
29	.....do	2.26	150	Sept. 7	F. E. Moxley	−0.09	7.6
July 1	F. E. Moxley	2.22	147	14	R. S. Skillin	....	4.6
6	R. S. Skillin	2.54	175	17	F. E. Moxley	−0.20	5.3

Daily discharge, in second-feet, of Old Reservation canal near Parker, Wash., for the year ending Sept. 30, 1915.

Day.	Oct.	Apr.	May.	June.	July.	Aug.	Sept.
1	87	33	255	236	146	121	9
2	87	33	254	218	146	116	9
3	87	33	258	196	146	116	9
4	87	33	244	184	160	114	9
5	81	38	233	162	170	120	9
6	66	46	224	160	179	105	9
7	90	46	220	156	171	100	9
8	94	46	229	156	162	99	24
9	84	46	245	146	134	108	12
10	86	48	276	152	122	74	11
11	87	48	277	138	124	37	10
12	70	77	265	124	130	18	8
13	60	82	258	116	130	12	6
14	60	84	251	124	130	12	5
15	....	89	242	121	124	12	5
16	....	100	226	128	136	22	5
17	....	134	232	158	130	17	5
18	....	156	245	157	127	10	....
19	....	174	238	149	121	9	....
20	....	202	233	148	121	8	....
21	....	217	222	155	125	8	....
22	....	222	212	151	127	8	....
23	....	226	208	133	127	8	....
24	....	226	209	134	122	26	....
25	....	226	209	138	122	9	....
26	....	229	202	136	117	9	....
27	....	240	196	147	124	9	....
28	....	217	222	148	120	9	....
29	....	258	245	149	120	9	....
30	....	258	240	149	126	9	....
31	....	....	239	....	127	9	....

NOTE.—Discharge ascertained from rating curve well defined between 15 and 300 second-feet. Sept. 12, 13, 15, and 16 gage not read; discharge interpolated.

Monthly discharge of Old Reservation canal near Parker, Wash., for the year ending Sept. 30, 1915.

Month.	Discharge in second-feet.			Run-off (total in acre-feet).	Accuracy.
	Maximum.	Minimum.	Mean.		
October 1-14	94	60	80.4	2,230	B.
April	258	33	130	7,730	A.
May	277	196	236	14,500	A.
June	236	116	152	9,060	A.
July	179	117	134	8,250	A.
August	121	8	43.3	2,660	B.
September 1-17	24	5	9.06	305	C.

SUNNYSIDE CANAL NEAR PARKER, WASH.

Location.—In sec. 28, T. 12 N., R. 19 E., about 600 feet below intake, 1½ miles east of Parker, and 3½ miles northwest of Wapato, in Yakima County.

Records available.—Irrigation seasons 1904–1915.

Gage.—Lietz water-stage recorder since April 20, 1909, on right side about 600 feet below intake; inspected several times daily by Henry Hanson. Vertical staff at same site as water-stage recorder since April 6, 1908. Prior to that date vertical staff on left side about 200 feet above present gage and at different datum. An inclined staff gage, installed April 6, 1907, at approximately same site as present gage, in use during 1907, but gage heights referred to datum of original gage.

Discharge measurements...Made from gaging bridge about 30 feet below gage.

Channel and control.—Gravel; fairly permanent. Operation of flashboards at drop No. 1 renders control unstable.

Extremes of discharge.—Maximum stage recorded during year, 5.05 feet July 3 (discharge, 1,030 second-feet); no water in canal November 7 to March 9.

1904–1915: Maximum stage recorded, 5.05 feet July 3, 1915 (discharge, 1,030 second-feet); no water in canal during nonirrigating seasons.

Accuracy.—Stage-discharge relation affected by variable velocity of approach due to different gate openings at headworks and by operation of flashboards at drop No. 1. Frequent discharge measurements render results excellent except for August and September, when stage-discharge relation was more unstable than for remainder of year.

Cooperation.—Records of discharge and discharge measurements furnished by United States Reclamation Service.

Discharge measurements of Sunnyside canal near Parker, Wash., during the year ending Sept. 30, 1915.

Date.	Made by—	Gage height.	Discharge.	Date.	Made by—	Gage height.	Discharge.
		Feet.	*Sec.-ft.*			*Feet.*	*Sec.-ft.*
Oct. 5	H. W. Humphrey	3.13	448	July 13	G. D. Hall	4.59	886
14	.....do	2.95	390	21	.....do	4.54	860
22	.....do	2.85	371	Aug. 2	.....do	4.46	824
31	Humphrey and Bates	1.49	125	10	F. E. Moxley	3.69	579
Mar. 21	Moore and Hall	2.32	303	14	G. D. Hall	2.18	196
Apr. 6	Hall and Moore	3.10	474	17	.....do	2.87	384
16	G. D. Hall	3.71	649	19	F. E. Moxley	3.33	462
27	.....do	4.41	887	23	G. D. Hall	3.63	565
May 8	Parker and Taylor	4.46	894	25	Moxley and Taylor	1.07	55
11	Hall and Noble	4.41	883	31	G. D. Hall	3.29	453
24	Hall and Moore	4.21	808	Sept. 7	.....do	2.85	335
June 3	.....do	4.19	781	10	.....do	1.94	120
19	G. D. Hall	4.88	982	16	.....do	2.19	206
30	.....do	4.94	991	24	.....do	2.29	230

Daily discharge, in second-feet, of Sunnyside canal near Parker, Wash., for the year ending Sept. 30, 1915.

Day.	Oct.	Nov.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.
1	502	109	....	454	939	770	1,010	846	431
2	492	88	....	456	952	770	1,020	856	431
3	479	88	....	466	952	799	1,030	856	386
4	459	88	....	479	952	809	1,010	852	373
5	454	88	....	474	956	822	1,020	859	328
6	449	88	....	471	928	842	1,020	777	315
7	449	....	....	474	907	849	1,020	736	315
8	446	....	....	492	904	883	1,020	745	180
9	444	....	....	500	897	893	932	819	127
10	439	....	87	510	893	890	839	549	121
11	429	....	87	543	883	883	846	342	124
12	422	....	85	571	886	822	914	226	136
13	410	....	82	585	869	767	911	205	202
14	393	....	81	602	846	806	911	196	295
15	381	....	118	634	842	780	903	234	251
16	375	....	153	658	839	839	907	319	239
17	378	....	200	690	809	942	880	476	226
18	378	....	243	727	815	956	876	510	224
19	368	....	261	761	815	970	880	502	217
20	366	....	282	783	809	973	876	497	245
21	366	....	288	819	809	973	880	456	269
22	366	....	295	839	809	956	866	484	232
23	366	....	315	869	809	897	859	563	236
24	366	....	328	880	809	914	856	189	220
25	288	....	351	880	806	981	859	59	220
26	209	....	368	883	789	977	856	74	228
27	173	....	391	883	780	987	852	63	215
28	82	....	393	900	783	991	846	64	213
29	109	....	417	921	777	991	806	363	220
30	109	....	439	921	773	998	886	495	222
31	109	....	452	....	770	....	900	452	....

NOTE.—Discharge ascertained by method for shifting control.

Monthly discharge of Sunnyside canal near Parker, Wash., for the year ending Sept. 30, 1915.

Month.	Discharge in second-feet.			Run-off (total in acre-feet).	Accuracy.
	Maximum.	Minimum.	Mean.		
October	502	82	357	22,000	A.
November 1-6	109	88	91.5	1,090	B.
March 10-31	452	81	260	11,300	A.
April	921	454	671	39,900	A.
May	956	770	852	52,400	A.
June	998	767	891	53,000	A.
July	1,030	803	913	56,100	A.
August	859	59	473	29,100	B.
September	431	121	248	14,800	B.

TOPPENISH CREEK NEAR FORT SIMCOE, WASH.

Location.—In sec. 26, T. 10 N., R. 16 E., at Olney's ranch, about 1½ miles below highway bridge, 3½ miles southeast of Fort Simcoe, and about 5 miles southwest of White Swan, in Yakima County.

Drainage area.—124 square miles (measured on Plate I, Water-Supply Paper 369).

Records available.—February 27, 1909, to September 30, 1915.

Gage.—Since August 19, 1915, Stevens water-stage recorder on left bank, half a mile east of Olney ranch house. February 27, 1909, to July 22, 1913, chain gage on left bank, a quarter of a mile above present gage. July 23, 1913, to August 18, 1915, vertical staff attached to cottonwood tree on right bank, 150 feet above present gage; read to hundredths daily by Thomas Haynes.

Discharge measurements.—Made from cable or by wading.

Channel and control.—Since August 19, 1915, artificial concrete control 18 feet below gage; before that date gravel and small bowlders, which shifted at high stages. Banks covered with brush; subject to overflow in extreme floods.

Extremes of discharge.—Maximum stage recorded during year, 4.0 feet at 9.45 a. m. March 31 (discharge, 336 second-feet); minimum stage recorded, 0.95 foot at 9.20 a. m. January 17 (discharge, 3.5 second-feet).

1909–1915: Maximum stage recorded, 5.21 feet March 3, 1910 (discharge, 1,190 second-feet); minimum stage recorded January 17, 1915.

Winter flow.—Stage-discharge relation probably not affected by ice; open-channel rating curve assumed applicable.

Diversions.—A small irrigating ditch diverts above station.

Regulation.—None at present. Diversion of spring run-off into a reservoir on Simcoe Creek for use in irrigating Indian lands is proposed.

Accuracy.—Results obtained prior to installation of artificial control, fair; later results excellent.

Discharge measurements of Toppenish Creek near Fort Simcoe, Wash., during the year ending Sept. 30, 1915.

Date.	Made by—	Gage height.	Discharge.	Date.	Made by—	Gage height.	Discharge.
		Feet.	*Sec.-ft.*			*Feet.*	*Sec.-ft.*
Dec. 3	I. L. Collier	1.92	32	May 5	C. G. Paulsen	2.68	79.1
Mar. 17	G. L. Parker	3.48	233	Aug. 19	.....do	[a] 1.55	7.8
18	.....do	3.45	235	19	.....do	[a] 1.55	7.7

[a] New gage read 0.57 foot.

Daily discharge, in second-feet, of Toppenish Creek near Fort Simcoe, Wash., for the year ending Sept. 30, 1915.

Day.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	May.	June.	July.	Aug.	Sept.
1	21.7	32	37	22.5	32	104	83	49	25.0	13.0	6.7
2	22.0	38	38	19.0	27	118	83	47	22.0	11.0	7.2
3	25.6	37	32	18.6	33	118	83	44	22.0	11.0	7.2
4	24.0	39	32	23.0	34	111	83	44	22.0	11.0	7.2
5	23.2	38	36	23.5	34	111	83	40	20.0	9.0	7.2
6	22.8	34	37	23.5	32	104	83	37	17.0	9.0	7.7
7	23.2	36	39	23.5	35	104	73	37	15.0	8.0	8.3
8	23.2	33	46	23.0	34	104	73	37	15.0	8.0	8.8
9	24.0	36	39	19.0	35	92	73	37	13.0	8.0	8.8
10	25.2	37	32	14.3	35	92	78	34	11.0	8.0	8.8
11	28	38	32	14.6	35	86	73	34	11.0	8.0	10.0
12	28	38	26	11.6	36	92	83	40	11.0	8.0	10.0
13	28	39	39	9.2	36	92	83	40	11.0	8.0	10.7
14	27	59	39	8.4	52	131	83	37	11.0	8.0	10.7
15	26	59	32	5.0	51	118	73	37	9.0	8.0	10.0
16	27	43	32	4.0	52	131	73	34	9.0	8.0	9.3
17	28	42	26	3.5	82	238	68	31	9.0	8.0	8.8
18	28	37	32	3.6	84	220	64	31	9.0	7.8	8.8
19	45	38	32	3.7	118	220	64	28	9.0	7.7	8.3
20	42	36	30	3.8	118	238	60	28	9.0	7.2	8.3
21	34	37	23.5	3.7	131	256	55	28	8.0	7.7	8.3
22	32	37	26	3.7	131	256	55	28	8.0	7.2	8.3
23	30	38	24	3.6	131	256	60	28	8.0	7.2	8.3
24	29	39	26	14.6	131	256	55	28	8.0	7.2	8.8
25	29	39	32	7.0	118	276	55	28	8.0	6.7	8.8
26	29	46	38	9.4	118	276	55	28	8.0	5.9	8.8
27	28	37	29	7.0	118	296	55	28	8.0	5.9	8.3
28	29	38	25.5	9.0	92	276	51	28	8.0	5.9	8.8
29	29	36	23.0	13.1	....	296	51	28	11.0	5.9	8.8
30	28	37	23.0	14.6	....	316	51	28	22.0	5.9	9.3
31	29	....	23.0	33	....	336	51	....	20.0	6.3	....

NOTE.—Discharge ascertained as follows: Oct. 1 to Nov. 15, 1914, by method for shifting control; Nov. 16, 1914, to Mar. 31, 1915, from rating curve fairly well defined between 30 and 250 second-feet; May 5 to Aug. 18, 1915, from rating curve fairly well defined below 100 second-feet; Aug. 19 to Sept. 30, 1915, from rating curve well defined for the range of stage during the period. May 1–4, no record; discharge interpolated. Aug 9–12, 18, and Sept 6, 7, no record; discharge interpolated.

Monthly discharge of Toppenish Creek near Fort Simcoe, Wash., for the year ending Sept. 30, 1915.

Month.	Discharge in second-feet.			Run-off (total in acre-feet).	Accuracy.
	Maximum.	Minimum.	Mean.		
October	45	21.7	28.0	1,720	C.
November	59	32	39.1	2,330	C.
December	46	23	31.6	1,940	C.
January	33	3.5	12.8	787	C.
February	131	27	70.2	3,900	C.
March	336	86	185.0	11,400	C.
May	83	51	68.2	4,190	C.
June	49	28	34.2	2,040	C.
July	25	8	12.8	787	C.
August	13	5.9	7.95	489	B.
September	10.7	6.7	8.64	514	A.

SIMCOE CREEK NEAR FORT SIMCOE, WASH.

Location.—In sec. 34, T. 11 N., R. 16 E., just above Spring Creek, at site of a proposed reservoir, 4 miles northeast of Fort Simcoe, in Yakima County.

Drainage area.—77 square miles (measured on Plate 1, Water-Supply Paper 369).

Records available.—February 28, 1909, to November 20, 1915, when station was discontinued.

Gage.—Vertical staff attached to cottonwood tree on right bank about 100 yards above Spring Creek; read to hundredths twice each week, October to March; three to five times a week, April to June; and once a week July to September, by J. E. Bowlin. Prior to March 24, 1910, a chain gage at same site and datum.

Discharge measurements.—Made from foot log or by wading.

Channel and control.—Sand and gravel; shifts during high stages. Control 30 feet below gage. One channel at all stages.

Extremes of discharge.—Maximum stage recorded during year, 3.2 feet at 3 p. m. March 1 (discharge, 192 second-feet); minimum stage recorded, 0.99 foot August 21, 28, and September 2, 25 (discharge, 0.4 second-foot).

1909–1915: Maximum stage recorded, 6.5 feet March 2, 1910 (discharge, 1,340 second-feet). No flow September 13 to October 10, 1909.

Winter flow.—Stage-discharge relation not seriously affected by ice; open channel rating curve assumed applicable.

Accuracy.—Practically no diurnal fluctuation. Results fair, except when gage was not read frequently.

Discharge measurements of Simcoe Creek near Fort Simcoe, Wash., during the year ending Sept. 30, 1915.

Date.	Made by—	Gage height.	Discharge.	Date.	Made by—	Gage height.	Discharge.
		Feet.	*Sec.-ft.*			*Feet.*	*Sec.-ft.*
Dec. 3	I. L. Collier	1.30	2.95	May 4	C. G. Paulsen	1.79	27.4
Mar. 18	G. L. Parker	2.34	65.9	Aug. 19	.....do	1.00	.40
May 4	C. G. Paulsen	1.78	26.4				

Daily discharge, in second-feet, of Simcoe Creek near Fort Simcoe, Wash., from Oct. 1, 1914, to Nov. 20, 1915.

Day.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.
1	0.8	3.5	[a]9.0	4.2	7.4	192	85	45	15	3.6	0.8	0.4	0.5	0.6
2	.6	3.4	6.0	4.2	8.0	166	85	30	16	3.8	.8	.4	.5	.6
3	.4	3.3	3.0	6.3	8.5	140	74	28	16	3.6	.8	.4	.5	.6
4	.4	3.2	3.1	8.4	9.0	114	148	27	15	3.4	.8	.4	.5	.6
5	.4	3.1	3.2	7.0	9.5	89	86	26	12.3	3.2	.7	.4	.5	.6
6	.4	3.0	3.3	5.6	10	64	89	25	9.6	3.1	.7	.4	.5	.6
7	.4	3.0	3.4	4.2	10	65	92	30	6.6	3.0	7	.4	.5	.6
8	.5	2.8	3.5	4.2	10	67	98	36	7.6	2.9	.6	.4	.5	.6
9	.6	2.6	3.6	4.2	10	69	104	32	8.5	2.8	.6	.4	.5	.5
10	.7	2.5	3.8	4.2	10	79	95	27	10.2	2.7	.6	.4	.5	.5
11	.7	2.4	4.0	4.2	10	89	86	24	12.0	2.7	.5	.4	.5	.5
12	.8	3.1	4.2	4.2	10	99	84	21	10.1	2.8	.5	.4	.5	.5
13	.9	3.8	3.9	4.2	10	110	81	20	8.2	2.8	.5	.4	.6	.5
14	1.0	4.5	3.6	4.2	12	102	84	20	7.3	2.9	.5	.4	.6	.5
15	1.0	5.3	3.3	4.2	15	93	86	21	6.4	3.0	.5	.4	.6	.5
16	1.1	5.3	3.0	4.2	17	85	84	22	5.6	3.1	.5	.4	.6	.5
17	1.1	5.3	2.8	4.2	20	77	81	23	4.9	2.6	.5	.4	.6	.5
18	4.2	5.3	2.6	4.2	36	69	66	22	4.9	2.1	.4	.4	.6	.5
19	3.7	5.3	2.4	4.2	52	69	62	21	4.9	1.6	.4	.4	.6	.5
20	3.3	5.3	2.6	4.2	69	69	58	21	3.8	1.2	.4	.4	.6	.5
21	2.9	5.3	2.8	4.2	86	70	72	21	3.6	1.2	.4	.4	.6	......
22	2.5	5.3	3.0	4.2	104	71	86	20	3.4	1.2	.4	.4	.6	......
23	2.1	5.3	3.3	4.2	122	72	74	19	3.2	1.2	.4	.4	.6	......
24	1.7	5.3	3.6	4.3	140	74	61	16	3.0	1.1	.4	.4	.6	......
25	1.9	9.0	3.9	4.4	154	77	43	12	2.8	1.1	.4	.4	.6	......
26	2.1	12	4.2	4.5	168	80	70	11.8	2.7	1.1	.4	.4	.5	......
27	2.3	16	4.2	4.7	183	66	98	11.5	2.8	1.1	.4	.4	.5	......
28	2.6	20	4.2	4.9	188	53	87	14	3.0	1.1	.4	.4	.5	......
29	2.9	16	4.2	5.1	......	54	76	17	3.2	1.0	.4	.4	.5	......
30	3.2	12	4.2	5.3	......	55	60	16	3.4	1.0	.4	.5	.5	......
31	3.5	......	4.2	6.8	......	70	......	14	......	.9	.4	......	.6	......

NOTE.—Discharge ascertained as follows: Oct. 1 to May 4, from rating curve well defined below 150 second-feet; May 5 to Nov. 20, from rating curve fairly well defined below 160 second-feet. Discharge interpolated for days when gage was not read.

Monthly discharge of Simcoe Creek near Fort Simcoe, Wash., for the period Oct. 1, 1914, to Nov. 20, 1915.

Month.	Discharge in second-feet.			Run-off (total in acre-feet).	Accuracy.
	Maximum.	Minimum.	Mean.		
1914-15.					
October	4.2	0.4	1.64	101	
November	20	2.4	6.07	361	D.
December	[a]9.0	2.4	3.75	231	D.
January	8.4	4.2	4.75	292	D.
February	[a]188	[a]7.4	53.2	2,950	C.
March	192	53	85.5	5,260	C.
April	148	58	81.8	4,870	C.
May	45	11.5	22.4	1,380	C.
June	16	2.7	7.20	428	C.
July	3.8	.9	2.22	136	
August	.8	.4	.523	32	
September	.5	.4	.403	23.8	
The year	192	.4	22.2	16,100	
1915.					
October	.6	.5	.545	33.5	
November 1-20	.6	.5	.540	21.4	

[a] Interpolated value.

RESERVATION DRAIN AT ALFALFA, WASH.

Location.—In sec. 29, T. 10 N., R. 21 E., at the highway bridge one-fourth mile southeast of Alfalfa, in Yakima County, and about 2 miles above the mouth of drain.

Records available.—December 5, 1912, to September 30, 1915, miscellaneous measurements 1911 and 1912.

Gage.—Vertical staff on right bank under highway bridge; read once daily to hundredths by Nellie Ide.

Discharge measurements.—Made from footbridge just above highway bridge at mouth of drain 2 miles below gage.

Channel and control.—Composed of gravel; shifts at all stages. Banks high; current swift.

Extremes of discharge.—Maximum stage recorded during year, 1.65 feet October 13 (discharge, 254 second-feet); minimum stage recorded, 1.8 feet July 3, August 12, 15–31, September 1–14, and 19 (discharge, 145 second-feet).

1913–1915: Maximum stage recorded, 1.65 feet May 9 and 11, 1913 (discharge, 264 second-feet); minimum stage recorded in 1915.

Winter flow.—Ice does not form at this station.

Diversions.—None.

Regulation.—None.

Accuracy.—Gage-height record not reliable October to March. Periods of shifting control short and defined by frequent measurements. Results October to March, good; April to September, excellent.

Cooperation.—Station maintained in cooperation with United States Indian Service.

The discharge includes the return water from irrigation by the reservation canals and the underflow of Toppenish Valley. During the low-water period practically the whole flow of Toppenish Creek is carried into this canal by underground seepage.

Discharge measurements of Reservation drain at Alfalfa, Wash., during the year ending Sept. 30, 1915.

Date.		Made by—	Gage height.	Discharge.	Date.		Made by—	Gage height.	Discharge.
			Feet.	*Sec.-ft.*				*Feet.*	*Sec.-ft.*
Oct.	3	R. S. Skillin [a]	1.51	227	Apr.	20	R. S. Skillin	2.06	178
	11	do	1.56	231		24	do	2.02	167
	23	Darr and Skillin [a]	1.47	217	May	1	do	2.00	171
	31	Skillin and Stevens [a]	1.44	210		8	C. G. Paulsen	1.99	173
Nov.	7	do	1.41	202		8	R. S. Skillin	1.99	168
	14	do	1.42	208		15	do	2.09	182
	21	do	1.41	201		22	do	2.08	181
	28	do	1.41	205		28	do	2.22	191
Dec.	2	I. L. Collier	1.40	194	June	5	do	2.09	176
	4	R. S. Skillin	1.41	202		12	do	2.06	173
	12	do	1.41	202		19	do	1.97	166
	19	do	1.37	189		28	do	1.91	155
	26	do	1.35	182	July	3	do	1.85	154
Jan.	2	do	1.36	183		10	do	1.87	163
	9	do	1.37	186		11	C. G. Paulsen	1.87	165
	16	do	1.39	189		17	R. S. Skillin	1.93	172
	23	do	2.03	187		24	do	1.86	161
	30	do	2.05	178		31	do	1.91	159
Feb.	6	do	2.08	186	Aug.	6	do	1.87	152
	13	do	2.16	195		6	do	1.87	150
	20	do	2.23	205		11	C. G. Paulsen	1.87	156
	27	do	2.23	206		14	R. S. Skillin	1.87	151
Mar.	6	do	2.23	205		21	do	1.82	148
	10	G. L. Parker	2.18	182		23	do	1.80	150
	10	do	2.18	184		27	do	1.79	141
	13	R. S. Skillin	2.15	192	Sept.	3	do	1.77	136
	20	do	2.11	191		11	do	1.80	146
	27	do	2.07	186		21	do	1.86	151
Apr.	3	do	2.06	183		21	do	1.86	149
	10	do	2.06	184		27	do	1.86	148

[a] Engineers, U. S. Indian Service.

Daily discharge, in second-feet, of Reservation drain at Alfalfa, Wash., for the year ending Sept. 30, 1915.

Day.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.
1	223	213	210	193	189	211	178	167	189	156	167	145
2	223	203	194	183	189	211	189	167	189	156	167	145
3	223	203	199	193	189	208	189	178	189	145	167	145
4	234	203	202	193	189	206	178	167	189	151	167	145
5	234	203	202	193	189	203	189	178	178	152	167	145
6	234	213	202	193	189	200	189	167	178	154	156	145
7	234	203	202	193	200	196	189	167	167	156	156	145
8	234	203	202	193	200	192	178	167	167	162	156	145
9	234	203	202	183	200	187	178	178	167	160	156	145
10	234	203	204	193	200	183	189	178	178	167	156	145
11	234	203	204	193	200	188	189	178	167	167	156	145
12	244	213	202	203	200	193	189	178	178	167	145	145
13	254	203	202	193	200	200	189	178	167	156	156	145
14	244	203	203	193	200	200	178	178	178	167	156	145
15	234	203	203	193	200	200	178	178	167	167	145	156
16	234	203	204	193	200	200	178	178	167	178	145	156
17	223	213	204	193	200	200	178	178	167	167	145	156
18	223	213	205	203	200	189	178	178	167	167	145	156
19	223	203	183	178	200	189	189	178	167	167	145	145
20	223	203	193	178	200	189	189	178	167	167	145	156
21	234	203	193	178	211	189	186	178	167	167	145	156
22	234	203	193	178	211	189	172	178	167	167	145	167
23	213	203	193	178	211	189	167	178	167	156	145	167
24	223	203	193	178	211	189	167	178	167	167	145	156
25	223	213	193	178	211	189	167	189	167	164	145	156
26	223	213	183	178	200	189	167	189	167	160	145	156
27	223	203	193	178	200	189	167	189	156	158	145	156
28	223	203	193	178	200	178	167	189	156	156	145	156
29	223	213	193	178	....	189	167	189	156	157	145	156
30	223	213	193	178	....	178	167	189	156	155	145	156
31	213	....	193	189	....	178	....	189	....	156	145	....

NOTE.—Discharge ascertained from four well-defined rating curves applicable as follows: Oct. 1 to Nov. 28; Dec. 19 to Jan. 18; Jan. 19 to Mar. 6, Mar. 13 to Apr. 20, July 10–24; and Apr. 24 to July 3, July 31 to Sept. 30; and by method for shifting control from Nov. 29 to Dec. 18, Mar. 7–12, Apr. 21–23, July 4–9, and July 25–30. Discharge interpolated, gage heights unreliable, Mar. 3–5, 7–9, and Apr. 25.

Monthly discharge of Reservation drain near Alfalfa, Wash., for the year ending Sept. 30, 1915.

Month.	Discharge in second-feet.			Run-off (total in acre-feet).	Accuracy.
	Maximum.	Minimum.	Mean.		
October	254	213	229	14,100	B.
November	213	203	206	12,300	B.
December	210	183	198	12,200	B.
January	203	178	187	11,500	B.
February	211	189	200	11,100	B.
March	211	178	193	11,900	B.
April	189	167	179	10,700	A.
May	189	167	178	10,900	A.
June	189	156	170	10,100	A.
July	178	145	161	9,900	A.
August	167	145	151	9,280	A.
September	167	145	151	8,980	A.
The year	254	145	184	133,000	

SATUS CREEK BELOW DRY CREEK, NEAR TOPPENISH, WASH.

LOCATION.—In sec. 24, T. 9 N., R. 19 E., at dam site about a mile below mouth of Dry Creek, and 9 miles southwest of Toppenish, in Yakima County.

DRAINAGE AREA.—427 square miles (measured on topographic and Yakima Indian Reservation maps).

RECORDS AVAILABLE.—June 22, 1913, to September 30, 1915.

GAGE.—Stevens water-stage recorder on left bank at dam site.

Discharge measurements.—Made from cable, or by wading.

Channel and control.—Small boulders and gravel; shifting at high stages.

Extremes of discharge.—Maximum stage during year from water-stage recorder, 4.5 feet at 4 a. m. March 16 (discharge, 1,000 second-feet); minimum stage from recorder, 0.28 foot at 10 p. m. August 28 and at 4 a. m. August 30 (discharge, 6.6 second-feet).

1913–1915: Maximum stage from water-stage recorder, 4.86 feet at 7 p. m. February 27, 1914 (discharge, 997 second-feet); minimum stage from recorder. August 28 and 30, 1915.

Winter flow.—Stage-discharge relation not seriously affected by ice.

Diversion.—Entire flow of Satus Creek above Lazy Creek is diverted for irrigation during July and August, and the records for low-water summer months show the run-off of Lazy and Dry creeks and the seepage return from upper Satus Creek,

Regulation.—None.

Accuracy.—Results excellent during periods when water-stage recorder was operating.

Discharge measurements of Satus Creek below Dry Creek, near Toppenish, Wash., during the year ending Sept. 30, 1915.

Date.	Made by—	Gage height.	Discharge.	Date.	Made by—	Gage height.	Discharge.
		Feet.	*Sec.-ft.*			*Feet.*	*Sec.-ft.*
Dec. 1	I. L. Collier	0.89	34.0	May 9	C. G. Paulsen	1.65	116
Mar. 11	G. L. Parker	2.47	267	July 10	.....do	.57	15.0
12	.....do	2.45	261	Aug. 10	.....do	.35	7.9

Daily discharge, in second-feet, of Satus Creek below Dry Creek, near Toppenish, Wash., for the year ending Sept. 30, 1915.

Day.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.
1	13	25	29	31	34	265	274	124	55	16	12	8.2
2	14	30	30	31	41	300	354	122	52	15	11	8.4
3	16	28	31	31	40	325	373	115	50	15	9.4	8.9
4	16	33	31	31	38	320	330	112	46	15	9.2	8.7
5	16	31	31	31	39	310	292	106	43	14	8.9	8.4
6	16	29	31	31	42	300	266	109	37	14	8.7	8.7
7	16	30	29	31	44	294	259	106	34	14	8.2	9.4
8	16	29	29	31	45	290	250	106	32	16	8.2	9.7
9	16	29	29	31	46	286	228	112	35	15	8.4	9.7
10	20	28	23	31	47	284	218	112	37	14	8.2	9.7
11	24	28	20	31	48	271	208	116	40	14	8.0	10
12	24	28	18	32	50	252	214	116	40	13	8.0	11
13	24	39	15	33	56	245	232	116	40	13	8.2	12
14	22	46	18	34	59	524	220	106	34	15	8.2	12
15	18	40	20	34	57	748	206	98	31	14	8.2	11
16	19	37	25	30	60	708	199	91	29	15	8.2	11
17	20	37	23	29	60	541	195	98	27	15	8.2	11
18	20	35	22	30	77	490	195	101	26	15	8.2	10
19	35	34	25	33	85	392	193	92	26	14	8.2	10
20	32	34	28	34	86	339	189	86	26	13	8.0	9.7
21	29	34	29	27	91	316	180	82	24	12	8.2	9.7
22	25	33	29	26	245	310	168	78	22	11	8.2	9.7
23	24	32	29	28	412	327	156	76	20	11	8.0	10
24	23	31	29	31	325	348	150	82	19	11	7.7	11
25	22	31	29	28	300	310	146	78	19	11	7.7	10
26	22	31	29	28	265	262	138	72	19	10	7.7	10
27	22	31	29	29	244	226	135	69	19	10	7.7	9.7
28	21	31	29	31	220	226	134	72	19	11	7.5	10
29	21	30	28	36	....	252	138	68	18	11	7.2	11
30	21	30	28	34	....	262	130	63	17	13	7.5	11
31	21	....	28	34	....	264	....	59	....	14	7.7	....

Note.—Discharge ascertained from rating curve well defined between 8 and 1,400 second-feet. Oct. 5–27 and Feb. 22 to Mar. 10, discharge estimated, by comparative hydrographs with Toppenish Creek near Fort Simcoe, as in table. Discharge interpolated Nov. 28–31, June 9–10.

Monthly discharge of Satus Creek below Dry Creek, near Toppenish, Wash., for the year ending Sept. 30, 1915.

Month.	Discharge in second-feet.			Run-off (total in acre-feet).	Accuracy.
	Maximum	Minimum.	Mean.		
October	35	13	20.9	1,290	C.
November	46	25	32.1	1,910	A.
December	31	15	26.5	1,630	A.
January	36	26	31.0	1,910	A.
February	412	34	113	6,280	C.
March	748	226	342	21,000	B.
April	373	130	212	12,600	A.
May	124	59	94.9	5,840	A.
June	55	17	31.2	1,860	A.
July	16	10	13.4	824	B.
August	12	7.2	8.35	513	B.
September	12	8.2	9.99	594	B.
The year	748	7.2	77.7	56,300	

MISCELLANEOUS MEASUREMENTS.

The following discharge measurements are arranged in the same order of drainage basins as the regular stations:

Miscellaneous discharge measurements in drainage basins in Washington for the year ending Sept. 30, 1915.

Nisqually River drainage basin.

Date.	Stream.	Tributary to—	Locality.	Gage height.	Discharge.
				Feet.	*Sec.-ft.*
Oct. 8	Nisqually River	Puget Sound	Former gaging station, ¼ mile below Mount Rainier National Park boundary.	4.42	276

Sultan River drainage basin.

Date.	Stream.	Tributary to—	Locality.	Gage height.	Discharge.
Aug. 4	Sultan River	Skykomish River	Camp Habecker, 9¼ miles above mouth in NE. ¼ NE. ¼, sec. 5, T. 28, R. 8 E., Snohomish County.	5.16	122
4	.....do	.....do	.....do	5.16	126
Sept. 26	.....do	.....do	Mouth		77.8

Stillaguamish River drainage basin.

Date.	Stream.	Tributary to—	Locality.	Gage height.	Discharge.
June 10	Canyon Creek	South Fork of Stillaguamish River.	Mouth	....	119
Sept. 4	.....do	.....do	.....do	....	43.5

Kettle River drainage basin.

Date.	Stream.	Tributary to—	Locality.	Gage height.	Discharge.
Aug. 6	Sherwood Creek	Kettle River	Highway bridge near Boyds, Wash., ¼ mile above mouth.	....	18.1

Miscellaneous discharge measurements in drainage basins in Washington for the year ending Sept. 30, 1915—Continued.

Nespelem River drainage basin.

Date.	Stream.	Tributary to—	Locality.	Gage height.	Discharge.
Mar. 22	Little Nespelem River	Nespelem River	¼ mile south of the agency, at highway bridge.	1.37	17.1
Apr. 9	do	do	do	1.53	20.6
9	do	do	do	.99	15.2
June 26	do	do	do	.75	8.3

Okanogan River drainage basin.

Date.	Stream.	Tributary to—	Locality.	Gage height.	Discharge.
May 25	Okanogan River	Columbia River	Highway bridge, at Oroville, Wash.		1,470
June 1	do	do	do		1,490
Aug. 7	do	do	do		872

Methow River drainage basin.

Date.	Stream.	Tributary to—	Locality.	Gage height.	Discharge.
Aug. 13	Methow River	Columbia River	Winthrop, Wash.		279
13	Clark-Dodd canal	Methow River	1 mile below intake and above all diversions.		6.2
13	F. Thompson ditch	Wolf Creek	300 feet below intake and above all diversions.		2.2
13	Geo. Thompson ditch	do	10 feet below intake		4.2
13	Little-Wetsell canal	do	½ mile below intake and above all diversions.		3.0
13	Banker-Wetsell canal	Methow River	¼ mile below intake and above all diversions.		7.1
13	Foghorn canal	do	do		22.9
13	Chewack Creek	do	Winthrop, Wash.	1.49	165
13	Chewack canal	Chewack Creek	½ mile north of Winthrop, above nearly all diversions.		11.5
13	Fulton canal	do	1 mile below intake and above all diversions.		15.8
14	Barclay canal	Methow River	1½ miles below intake and above nearly all diversions.		28.6
15	Twisp River	do	1 mile above mouth and and below all diversions.		11.5
14	Methow Canal Co.'s ditch (Blythe ditch).	Twisp River	1 mile west of Twisp and above all diversions.		42.2
14	Burke Lehman canal	do	2 miles below intake and above all diversions.		11.5
14	Byrnes ditch	do	20 feet below intake		2.8
14	Josh Risley canal	do	100 feet below intake		9.0
14	Garrison ditch	Methow River	50 feet below intake		3.3
16	Beaver Creek	do	2 miles below intake of Batties canal and about 7 miles above mouth.		6.2
16	Battie ditch	Beaver Creek	2 miles below intake and above all diversions.		4.8
16	Filer-Sampson ditch	do	1 mile below intake and above all diversions.		4.8
16	Watson ditch	do	¼ mile below intake and above nearly all diversions.		2.5
16	Gold Creek canal (north)	Gold Creek	1 mile below intake and above all diversions.		8.4
16	Gold Creek canal (south)	do	½ mile below intake and above all diversions.		4.4
16	Bollinger canal	Methow River	do		3.1
12	Steiner (Sexsmith canal)	do	3 miles below intake and above nearly all diversions.		8.8
12	Starr canal	do	¼ mile west of Pateros, Wash.		9.5
11	Parker ditch	do	2½ miles below intake and above all diversions.		2.4

Miscellaneous discharge measurements in drainage basins in Washington for the year ending September 30, 1915—Continued.

Yakima River drainage basin.

Date.	Stream.	Tributary to—	Locality.	Gage height.	Discharge.
				Feet.	*Sec.-ft.*
Aug. 19	Nicol ditch	Toppenish Creek	Near new gaging station on Toppenish Creek.	0.70	3.4
May 4	Spring Creek	Simcoe Creek	Mouth, near Simcoe Creek gage.		1.5
Aug. 19	.....do	.....do	.....do		.7

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STREAM-GAGING STATIONS

AND

PUBLICATIONS RELATING TO WATER RESOURCES

PART XII.—NORTH PACIFIC SLOPE BASINS

STREAM-GAGING STATIONS AND PUBLICATIONS RELATING TO WATER RESOURCES.

INTRODUCTION.

Investigation of water resources by the United States Geological Survey has consisted in large part of measurements of the volume of flow of streams and studies of the conditions affecting that flow, but it has comprised also investigation of such closely allied subjects as irrigation, water storage, water powers, underground waters, and quality of waters. Most of the results of these investigations have been published in the series of water-supply papers, but some have appeared in the bulletins, monographs, professional papers, and annual reports.

The results of stream-flow measurements are now published annually in 12 parts, each part covering an area whose boundaries coincide with natural drainage features as indicated below:

Part I. North Atlantic slope basins.
II. South Atlantic slope and eastern Gulf of Mexico basins.
III. Ohio River basin.
IV. St. Lawrence River basin.
V. Upper Mississippi River and Hudson Bay basins.
VI. Missouri River basin.
VII. Lower Mississippi River basin.
VIII. Western Gulf of Mexico basins.
IX. Colorado River basin.
X. Great Basin.
XI. Pacific slope basins in California.
XII. North Pacific slope basins, in three volumes:
    A, Pacific slope basins in Washington and upper Columbia River basin.
    B, Snake River basin.
    C, Lower Columbia River basin and Pacific slope basins in Oregon.

HOW GOVERNMENT REPORTS MAY BE OBTAINED OR CONSULTED.

Water-supply papers and other publications of the United States Geological Survey containing data in regard to the water resources of the United States may be obtained or consulted as indicated below.

1. Copies may be obtained free of charge by applying to the Director of the Geological Survey, Washington, D. C. The edition printed for free distribution is, however, small and is soon exhausted.

2. Copies may be purchased at nominal cost from the Superintendent of Documents, Government Printing Office, Washington, D. C., who will on application furnish lists giving prices.

3. Sets of the reports may be consulted in the libraries of the principal cities in the United States.

4. Complete sets are available for consultation in the local offices of the water-resources branch of the Geological Survey, as follows:

Boston, Mass., 2500 Customhouse.
Albany, N. Y., Room 18, Federal Building.
Atlanta, Ga., Post Office Building.
Madison, Wis., care of Railroad Commission of Wisconsin.
Topeka, Kans., 25 Federal Building.
Helena, Mont., Montana National Bank Building.
Denver, Colo., 403 New Post Office Building.
Salt Lake City, Utah, 421 Federal Building.
Boise, Idaho, 615 Idaho Building.
Portland, Oreg., 416 Couch Building.
Tacoma, Wash., 406 Federal Building.
San Francisco, Cal., 328 Customhouse.
Los Angeles, Cal., 619 Federal Building.
Phoenix, Ariz., 417 Fleming Building.
Austin, Tex., Old Post Office Building.
Honolulu, Hawaii, 14 Capitol Building.

A list of the Geological Survey's publications may be obtained by applying to the Director of the United States Geological Survey, Washington, D. C.

STREAM-FLOW REPORTS.

Stream-flow records have been obtained at more than 3,800 points in the United States, and the data obtained have been published in the reports tabulated below:

Stream-flow data in reports of the United States Geological Survey.

A=Annual Report; B=Bulletin; W=Water-Supply Paper.]

Report.	Character of data.	Year.
10th A, pt. 2	Descriptive information only	
11th A, pt. 2	Monthly discharge and descriptive information	1884 to September, 1890.
12th A, pt. 2	do	1884 to June 30, 1891.
13th A, pt. 3	Mean discharge in second-feet	1884 to Dec. 31, 1892.
14th A, pt. 2	Monthly discharge (long-time records, 1871 to 1893)	1888 to Dec. 31, 1893.
B 131	Descriptions, measurements, gage heights, and ratings	1893 and 1894.
16th A, pt. 2	Descriptive information only	
B 140	Descriptions, measurements, gage heights, ratings, and monthly discharge (also many data covering earlier years).	1895.
W 11	Gage heights (also gage heights for earlier years)	1896.
18th A, pt. 4	Descriptions, measurements, ratings, and monthly discharge (also similar data for some earlier years).	1895 and 1896.
W 15	Descriptions, measurements, and gage heights, eastern United States, eastern Mississippi River, and Missouri River above junction with Kansas.	1897.
W 16	Descriptions, measurements, and gage heights, western Mississippi River below junction of Missouri and Platte, and western United States.	1897.
19th A, pt. 2	Descriptions, measurements, ratings, and monthly discharge (also some long-time records).	1897.
W 27	Measurements, ratings, and gage heights, eastern United States, eastern Mississippi River, and Missouri River.	1898.
W 28	Measurements, ratings, and gage heights, Arkansas River and western United States.	1898.

Stream flow data in reports of the United States Geological Survey—Continued.

Report.	Character of data.	Year.
20th A, pt. 4	Monthly discharge (also for many earlier years)	1898.
W 35 to 39	Descriptions, measurements, gage heights, and ratings	1899.
21st A, pt. 4	Monthly discharge	1899.
W 47 to 52	Descriptions, measurements, gage heights, and ratings	1900.
22d A, pt. 4	Monthly discharge	1900.
W 65, 66	Descriptions, measurements, gage heights, and ratings	1901.
W 75	Monthly discharge	1901.
W 82 to 85	Complete data	1902.
W 97 to 100	.....do	1903.
W 124 to 135	.....do	1904.
W 165 to 178	.....do	1905.
W 201 to 214	.....do	1906.
W 241 to 252	.....do	1907–8.
W 261 to 272	.....do	1909.
W 281 to 292	.....do	1910.
W 301 to 312	.....do	1911.
W 321 to 332	.....do	1912.
W 351 to 362	.....do	1913.
W 381 to 394	.....do	1914.
W 401 to 414	.....do	1915.

The records at most of the stations discussed in these reports extend over a series of years, and miscellaneous measurements at many points other than regular gaging stations have been made each year. An index of the reports containing records obtained prior to 1904 has been published in Water-Supply Paper 119.

The table following gives, by years and drainage basins, the numbers of the papers on surface-water supply published from 1899 to 1915. The data for any particular station will, as a rule, be found in the reports covering the years during which the station was maintained. For example, data for Machias River at Whitneyville, Me., 1903 to 1915, are published in Water-Supply Papers 97, 124, 165, 201, 241, 261, 281, 301, 321, 351, 381, and 401, which contain records for the New England streams from 1903 to 1915. Results of miscellaneous measurements are published by drainage basins.

In these papers and in the following lists the stations are arranged in downstream order. The main stem of any river is determined by measuring or estimating its drainage area—that is, the headwater stream having the largest drainage area is considered the continuation of the main stream, and local changes in name and lake surface are disregarded. All stations from the source to the mouth of the main stem of the river are presented first, and the tributaries in regular order from source to mouth follow, the streams in each tributary basin being listed before those of the next basin below.

In exception to this rule the records for Mississippi River are given in four parts, as indicated on page III, and the records for large lakes are presented in order of the streams around the rim of the lake.

Numbers of water-supply papers containing results of stream measurements, 1899–1915.

Year.	I	II	III	IV	V	VI	VII	VIII	IX	X	XI	XII		
												North Pacific slope basins.		
	North Atlantic slope basins (St. John River to York River).	South Atlantic slope and eastern Gulf of Mexico basins (James River to the Mississippi).	Ohio River basin.	St. Lawrence River basin.	Hudson Bay and upper Mississippi River basins.	Missouri River basin.	Lower Mississippi River basin.	Western Gulf of Mexico basins.	Colorado River basin.	Great Basin.	Pacific slope basins in California.	Pacific slope basins in Washington and upper Columbia River.	Snake River basin.	Lower Columbia River and Pacific slope basins in Oregon.
1899 [a].....	35	[b] 35, 36	36	36	36	[c] 36, 37	37	37	[d] 37, 38	38, [e] 39	38, [f] 39	38	38	38
1900 [g].....	47, [h] 48	48	48, [i] 49	49	49	49, [j] 50	50	50	50	51	51	51	51	51
1901.......	65, 75	65, 75	65, 75	65, 75	[k] 65, 66, 75	66, 75	[k] 65, 66, 75	66, 75	66, 75	66, 75	66, 75	66, 75	66, 75	66, 75
1902.......	82	[b] 82, 83	83	[l] 82, 83	[k] 83, 85	84	[k] 83, 84	84	85	85	85	85	85	85
1903.......	97	[b] 97, 98	98	97	[k] 98, 99, [m] 100	99	[k] 98, 99	99	100	100	100	100	100	100
1904.......	[n] 124, [o] 125, [p] 126	[p] 126, 127	128	129	[k] 128, 130	130, [q] 131	[k] 128, 131	132	133	133, [r] 134	134	135	135	135
1905.......	[n] 165, [o] 166, [p] 167	[p] 167, 168	169	170	171	172	[k] 169, 173	174	175, [s] 177	176, [r] 177	177	178	178	[t] 177, 178
1906.......	[n] 201, [o] 202, [p] 203	[p] 203, 204	205	206	207	208	[k] 205, 209	210	211	212, [r] 213	213	214	214	214
1907–8.....	241	242	243	244	245	246	247	248	249	250, [r] 251	251	252	252	252
1909.......	261	262	263	264	265	266	267	268	269	270, [r] 271	271	272	272	272
1910.......	281	282	283	284	285	286	287	288	289	290	291	292	292	292
1911.......	301	302	303	304	305	306	307	308	309	310	311	312	312	312
1912.......	321	322	323	324	325	326	327	328	329	330	331	332–A	332–B	332–C
1913.......	351	352	353	354	355	356	357	358	359	360	361	362–A	362–B	362–C
1914.......	381	382	383	384	385	386	387	388	389	390	391	392	393	394
1915.......	401	402	403	404	405	406	407	408	409	410	411	412	413	414

[a] Rating tables and index to Water-Supply Papers 35–39 contained in Water-Supply Paper 39. Tables of monthly discharge for 1899 in Twenty-first Annual Report, Part IV.

[b] James River only.

[c] Gallatin River.

[d] Green and Gunnison rivers and Grand River above junction with Gunnison.

[e] Mohave River only.

[f] Kings and Kern rivers and south Pacific slope drainage basins.

[g] Rating tables and index to Water-Supply Papers 47–52 and data on precipitation, wells, and irrigation in California and Utah contained in Water-Supply Paper 52. Tables of monthly discharge for 1900 in Twenty-second Annual Report, Part IV.

[h] Wissahickon and Schuylkill rivers to James River.

[i] Scioto River.

[j] Loup and Platte rivers near Columbus, Nebr., and all tributaries below junction with Platte.

[k] Tributaries of Mississippi from east.

[l] Lake Ontario and tributaries to St. Lawrence River proper.

[m] Hudson Bay only.

[n] New England rivers only.

[o] Hudson River to Delaware River, inclusive.

[p] Susquehanna River to Yadkin River, inclusive.

[q] Platte and Kansas rivers.

[r] Great Basin in California, except Truckee and Carson river basins.

[s] Below junction with Gila.

[t] Rogue, Umpqua, and Siletz rivers only.

NORTH PACIFIC SLOPE DRAINAGE BASINS.

PRINCIPAL STREAMS.

The largest rivers discharging into the Pacific Ocean in Oregon and Washington are Rogue, Umpqua, and Columbia rivers and streams that reach the ocean through Puget Sound. The principal tributaries of the Columbia are Kootenai, Clark Fork, Spokane, Wenatchee, Yakima, Snake, Walla Walla, Umatilla, John Day, Deschutes, Klickitat, Willamette, and Lewis rivers. Nisqually, Puyallup, White, Snohomish, and Skagit rivers flow into Puget Sound. The streams of this division drain wholly or in part the States of Idaho, Montana, Nevada, Oregon, Utah, Washington, and Wyoming.

In addition to the list of gaging stations and the annotated list of publications relating specifically to the section, these pages contain a similar list of reports that are of general interest in many sections and cover a wide range of hydrologic subjects, and also brief references to reports published by State and other organizations (see pp. XXXI–XXXII).

GAGING STATIONS.

Note.—Dash after a date indicates that station was being maintained September 30, 1915. Period after a date indicates discontinuance.

BETWEEN COLUMBIA RIVER AND PUGET SOUND.

Chehalis River at Centralia, Wash., 1910–11.
Quinault River at Quinault Lake, Wash., 1911–
Soleduck River near Quillayute, Wash., 1897–1901.
    Kalawa River near Forks, Wash., 1897–1901.

PUGET SOUND DRAINAGE BASINS.

Elwha River at McDonald, Wash., 1897–1901.
Elwha River near Port Angeles, Wash., 1911–12.
Dungeness River at Sequin, Wash., 1897–98.
Dungeness River at Dungeness, Wash., 1898–1901.
Dosewallips River at Brinnon, Wash., 1910–11.
Duckabush River near Duckabush, Wash., 1910–11.
Skokomish River, North Fork (head of Skokomish River), near Hoodsport, Wash., 1910–11.
Nisqually River near Ashford, Wash., 1910–1914.
Nisqually River near La Grande, Wash., 1906–1911.
Puyallup River near Electron, Wash., 1909–
Puyallup River at Alderton, Wash., 1914–
Puyallup River at Puyallup, Wash., 1914–
    Carbon River at Fairfax, Wash., 1910–1912.
    White River below Forks, near Enumclaw, Wash., 1911–12.

Puyallup River tributaries—Continued.
  White River at Buckley, Wash., 1899–1903; 1910–11; 1913–
    Greenwater River at mouth, near Enumclaw, Wash., 1911–12.
    White River flume at Buckley, Wash., 1913–
    Green River at Kanasket, Wash., 1911.
Duwamish River:
  Cedar River at Vaughn Bridge, near Cedar Lake, Wash., 1898–99.
  Cedar River at Cedar Lake, near North Bend, Wash., 1902–3.
  Cedar River near Cedar Falls, Wash., 1914–
  Cedar River near Landsburg, Wash., 1914–
  Cedar River near Ravensdale, Wash., 1901–1912.
  Cedar River at Clifford Bridge, near Ravensdale, Wash., 1895–1898.
Skykomish River, South Fork (head of Snohomish River), near Berlin, Wash., 1910–11.
Skykomish River, South Fork, near Index, Wash., 1902–1905; 1911–12; 1913–
Skykomish River at Sultan, Wash., 1910–11.
  Foss River near Skykomish, Wash., 1911.
    East Fork of Foss River near Skykomish, Wash., 1911.
  Miller Creek near Berlin, Wash., 1911–
    West Fork of Miller Creek near Berlin, Wash., 1911.
  North Fork of Skykomish River at Index, Wash., 1910–
  Snoqualmie River, Middle Fork (head of Snoqualmie River), near North Bend, Wash., 1907–8; 1908– (Records for this station and other stations in Snoqualmie River basin published in Water-Supply Paper 412.)
  Snoqualmie River near Snoqualmie, Wash., 1898–99; 1900; 1902–1904. (Revised records published in Water-Supply Paper 412.)
    North Fork of Snoqualmie River at cable bridge, near North Bend, Wash., 1913–1915.
    North Fork of Snoqualmie River near North Bend, Wash., 1907–
    South Fork of Snoqualmie River near Garcia, Wash., 1910–1915.
    South Fork of Snoqualmie River at North Bend, Wash., 1907–
    Tokul Creek near Snoqualmie, Wash., 1907–1914.
  Pilchuck Creek near Granite Falls, Wash., 1911.
Stilaguamish River, South Fork (head of Stilaguamish River), near Silverton, Wash., 1910–
Stilaguamish River, South Fork, near Robe, Wash., 1902–3.
Stilaguamish River, South Fork, at Granite Falls, Wash., 1911; 1913–
  Canyon Creek near Granite Falls, Wash., 1911–1913.
Skagit River at Reflector Bar, near Marblemount, Wash., 1913–
Skagit River near Marblemount, Wash., 1908–1914.
Skagit River near Sedro Woolley, Wash., 1908–
  Stetattle Creek near Marblemount, Wash., 1913–
  Cascade River near Marblemount, Wash., 1909–1913.
  Sauk River above Whitechuck River, near Darrington, Wash., 1910.
  Sauk River above Clear Creek, near Darrington, Wash., 1910–1913.
  Sauk River at Darrington, Wash., 1914–
  Sauk River at Suiattle Crossing, near Sauk, Wash., 1910–1912.
    Whitechuck River near Darrington, Wash., 1910.
    Clear Creek near Darrington, Wash., 1910–11.
  Baker Lake (on Baker River) near Concrete, Wash., 1910–1915.
  Baker River below Anderson Creek, near Concrete, Wash., 1910–
  Baker River at Concrete, Wash., 1910–1915.
Whatcom Lake near Bellingham, Wash., 1913–14.
Whatcom Creek near Bellingham, Wash., 1910–1914.

- Nooksack River,[1] North Fork (head of Nooksack River), near Glacier, Wash., 1910–11.
- Nooksack River near Deming, Wash., 1910–11.
  - Middle Fork of Nooksack River at ranger station near Deming, Wash., 1910–11.
  - Middle Fork of Nooksack River near Deming, Wash., 1910–11.

COLUMBIA RIVER BASIN.

- Columbia River at Wenatchee, Wash., 1910.
- Columbia River near Julia, Wash., 1905.
- Columbia River at Hanford, Wash., 1910.
- Columbia River at Pasco, Wash., 1904–1910.
- Columbia River at Cascade Locks and The Dalles, Oreg., 1878–
  - Kootenai River at Libby, Mont., 1910–
  - Kootenai River at Crossport, Idaho, 1904.
  - Kootenai River near Bonners Ferry, Idaho, 1904.
  - Kootenai River near Porthill, Idaho, 1904.
    - Callahan Creek at Troy, Mont., 1911–
    - Yaak River near Troy, Mont., 1910–
    - Moyie River at Snyder, Idaho, 1911–
  - Clark Fork at Missoula, Mont., 1898–1907.
  - Clark Fork at St. Regis, Mont., 1910–
  - Clark Fork near Plains, Mont., 1910–
  - Pend Oreille Lake at Sandpoint, Idaho, 1914–
  - Clark Fork at Priest River, Idaho, 1903–1905.
  - Clark Fork at Newport, Wash., 1904–1910.
  - Clark Fork at Metaline Falls, Wash., 1908–1910; 1912–
    - Racetrack Creek near Anaconda, Mont., 1911–12; 1914–
    - Little Blackfoot River and ditch near Elliston, Mont., 1910–
    - Rock Creek near Quigley, Mont., 1910–1912.
    - Big Blackfoot River at Bonner, Mont., 1898–1905.
    - Rattlesnake Creek at Missoula, Mont., 1898–1900.
    - Bitterroot River, West Fork (head of Bitterroot River), near Darby, Mont., 1910–
    - Bitterroot River near Grantsdale, Mont., 1902–1907.
    - Bitterroot River near Missoula, Mont., 1898–1901; 1903–4.
      - East Fork of Bitterroot River near Darby, Mont., 1910–
      - Lolo Creek near Lolo, Mont., 1910–
    - St. Regis River near St. Regis, Mont., 1910–
    - Flathead River near Columbia Falls, Mont., 1910–
    - Flathead River at Demersville, near Kalispell, Mont., 1910–1912.
    - Flathead River at Damon's ranch, near Kalispell, Mont., 1910–1912.
    - Flathead River at Keller's ranch, near Holt, Mont., 1910–1912.
    - Flathead Lake (on Flathead River) near Holt, Mont., 1900.
    - Flathead Lake at Polson, Mont., 1908–
    - Flathead River near Polson, Mont., 1907–
      - Middle Fork Flathead River at Belton, Mont., 1910–
        - Lake McDonald outlet at Lake McDonald, Mont., 1912–1914.
      - South Fork of Flathead River near Columbia Falls, Mont., 1910–
      - Swan River near Big Fork, Mont., 1910–11.
      - Stillwater River near Kalispell, Mont., 1906–7.
        - Whitefish River near Kalispell, Mont., 1906.
      - Little Bitterroot River near Marion, Mont., 1910–
      - Little Bitterroot River near Hubbart, Mont., 1909–

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[1] Revised decision of United States Geographic Board rendered Oct. 3, 1917.

- Columbia River tributaries—Continnued.
  - Clark Fork tributaries—Continued.
    - Flathead River tributaries—Continued.
      - Little Bitterroot River near Dayton, Mont., 1908–9.
      - Crow Creek near Ronan, Mont., 1906–
      - Crow Creek at Lozeau's ranch, near Ronan, Mont., 1911–
        - Mud Creek near Ronan, Mont., 1908–1910.
      - Mission Creek near St. Ignatius, Mont., 1906–
        - Dry Creek near St. Ignatius, Mont., 1908–
        - Post Creek at Fitzpatrick's ranch, near Ronan, Mont., 1906–1911.
        - Post Creek at Deschamp's ranch, near Ronan, Mont., 1911.
        - Post Creek near St. Ignatius, Mont., 1911–
      - Jocko River, South Fork (head of Jocko River), near Jocko, Mont., 1912–
      - Jocko River near Jocko, Mont., 1908–
      - Jocko River at Ravalli, Mont., 1906–1911.
        - Middle Fork of Jocko River near Jocko, Mont., 1912–
        - North Fork of Jocko River near Jocko, Mont., 1912–
          - Falls Creek near Jocko, Mont., 1912–
        - Big Knife Creek near Jocko, Mont., 1908–
        - Agency Creek near Jocko, Mont., 1908–
          - Blodgett Creek near Jocko, Mont., 1909–10.
        - Finley Creek near Jocko, Mont., 1908–
          - East Finley Creek near Jocko, Mont., 1908–
            - Indian ditch near Jocko, Mont., 1908–1911; 1912–
        - Valley Creek near Ravalli, Mont., 1908–1911.
      - Revais Creek near Dixon, Mont., 1911–
    - Thompson River near Thompson Falls, Mont., 1911–
    - Prospect Creek near Thompson Falls, Mont., 1911–
    - Priest River at outlet of Priest Lake, at Coolin, Idaho, 1911–
    - Priest River at Falk's ranch, near Priest River, Idaho, 1911–12.
    - Priest River near Priest River, Idaho, 1903–1905; 1910–11.
    - Sullivan Lake near Metaline Falls, Wash., 1912–
    - Sullivan Creek near Metaline Falls, Wash., 1912–
  - Kettle River at Curlew, Wash., 1911–12.
  - Kettle River at Boyds, Wash., 1913–1915.
  - Hall Creek near Inchelium, Wash., 1912–
  - Stranger Creek at Inchelium, Wash., 1914–
  - Cœur d'Alene River, North Fork (head of Cœur d'Alene River and through Cœur d'Alene Lake of Spokane River) at Prichard, Idaho, 1911–1914.
  - Cœur d'Alene River, North Fork, at Enaville, Idaho, 1911–1913.
  - Cœur d'Alene River near Cataldo, Idaho, 1911–12.
  - Cœur d'Alene Lake at Cœur d'Alene, Idaho, 1903–
  - Spokane River at Post Falls, Idaho, 1913–
  - Spokane River at Trent, Wash., 1911–1913.
  - Spokane River at Washington Water Power Co.'s dam, at Spokane, Wash., 1891–1896.
  - Spokane River at Spokane, Wash., 1896–
  - Spokane River near Long Lake, Wash., 1912–
    - Little North Fork of Cœur d'Alene River near Enaville, Idaho, 1911–12.
    - St. Joe River at Avery, Idaho, 1911–
    - St. Joe River near Calder, Idaho, 1911–12.
      - St. Maries River at Lotus, Idaho, 1911–12.
    - Spokane Valley Land & Water Co.'s canal near Post Falls, Idaho, 1911–

Columbia River tributaries—Continued.
- Spokane River tributaries—Continued.
    - Latah (Hangman) Creek at and near Tekoa, Wash., 1904–5.
        - North Fork of Latah Creek near Spokane, Wash., 1904–5.
    - Little Spokane River near Spokane, Wash., 1903–1905; 1911–1913.
- Sanpoil River at Keller, Wash., 1911–
- Nespelem River at Nespelem, Wash., 1911–
- Okanogan River at Okanogan, Wash., 1911–
    - Similkameen River near Oroville, Wash., 1911–
        - Sinlahekin Creek near Loomis, Wash., 1903–1905.
    - Johnson Creek near Riverside, Wash., 1903–1907.
    - Salmon Creek near Conconully, Wash., 1910–
    - Salmon Creek near Okanogan, Wash., 1903–1912.
- Methow River at Winthrop, Wash., 1912.
- Methow River at Pateros, Wash., 1903–
    - Chewack Creek at Winthrop, Wash., 1912–13.
    - Twisp River at Twisp, Wash., 1911–1913.
- Stehekin River (head of Chelan River) at Stehekin, Wash., 1910–
- Chelan Lake at Lakeside, Wash., 1897–1899.
- Chelan Lake at Chelan, Wash., 1905; 1910–
- Chelan River at Chelan, Wash., 1903–
    - Railroad Creek at Lucerne, Wash., 1910–1913.
- Entiat River at Entiat, Wash., 1910–
- Wenatchee River near Leavenworth, Wash., 1910–
- Wenatchee River at Dryden (Cashmere), Wash., 1904–
- Wenatchee River at Wenatchee, Wash., 1897.
    - White River near Chiwaukum, Wash., 1911–12; 1914.
    - Nason Creek near Nason, Wash., 1911.
    - Chiwawa Creek near Leavenworth, Wash., 1911–12; 1913–14.
    - Chiwaukum Creek near Chiwaukum, Wash., 1911.
    - Icicle Creek near Leavenworth, Wash., 1911–14.
    - Peshastin Creek at Blewett, Wash., 1911–12.
    - Peshastin Creek near Leavenworth, Wash., 1911–12.
    - Wenatchee Valley canal at Dryden, Wash. (irrigation seasons only), 1912–
- Crab Creek at Wilson Creek, Wash., 1904.
- Crab Creek at Adrian, Wash., 1910; 1911; 1912.
- Crab Creek near Ephrata, Wash., 1909.
- Moses Lake at Neppel (Moses Lake), Wash., 1909–1914.
- Crab Creek near Warden, Wash., 1909–1912.
- Rockyford Creek near Ephrata, Wash., 1909–1911.
- Keechelus Lake (on Yakima River) near Martin, Wash., 1906–
- Yakima River near Martin, Wash., 1903–
- Yakima River at Easton, Wash., 1904; 1910–1915.
- Yakima River at Cle Elum, Wash., 1906–
- Yakima River at Umtanum, Wash., 1906–
- Yakima River at Selah Gap, near Yakima,[1] Wash., 1897; 1904; 1911; 1912.
- Yakima River at Union Gap, Wash., 1894–1909; 1911–1914.
- Yakima River near Wapato, Wash., 1908–
- Yakima River at Mabton, Wash., 1904–1906; 1911–12.
- Yakima River near Prosser, Wash., 1904–1906; 1913–
- Yakima River at Kiona, Wash., 1895–1915.

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[1] Yakima; city and precinct, Yakima County, Wash.; not North Yakima. Decision of U. S. Geographic Board rendered Jan. 2, 1918.

Columbia River tributaries—Continued.

- Yakima River near Richland, Wash., 1906–1911.
    - Cabin Creek near Easton, Wash., 1909–1911.
    - Kachess Lake (on Kachess River) near Easton, Wash., 1905–
    - Kachess River near Easton, Wash., 1903–
    - Big Creek near Cle Elum, Wash., 1909.
    - Cle Elum River, North Fork (head of Cle Elum River), at Galena, Wash., 1907; 1911.
    - Cle Elum Lake near Roslyn, Wash., 1906–
    - Cle Elum River near Roslyn, Wash., 1903–
    - Teanaway River below Forks, near Cle Elum, Wash., 1911–12.
    - Teanaway River near Cle Elum, Wash., 1909–1911; 1912–1914.
    - Swauk Creek near Cle Elum, Wash., 1909–1912.
    - Cascade canal near Ellensburg (Thorp), Wash., 1905–6; 1909–1911.
    - West Kittitas canal near Thorp, Wash., 1904–1906; 1909–1911.
    - Ellensburg Water Co.'s canal near Ellensburg, Wash., 1904–5; 1909–1911.
    - Taneum Creek near Thorp, Wash., 1909–1912.
    - Manastash Creek near Ellensburg, Wash., 1909–1914.
    - Wilson Creek near Thrall, Wash., 1911.
    - Selah Moxee canal near Selah, Wash., 1904–5; 1909–1911.
    - Wenas Creek near Selah, Wash., 1909–1912.
    - Naches River at Anderson's ranch, near Nile, Wash., 1909–1914.
    - Naches River at Oak Flat, near Nile, Wash., 1904–
    - Naches River below Tieton River, near Naches, Wash., 1905; 1909–1912.
    - Naches River near Yakima,[1] Wash., 1893–1897; 1898–1912.
        - Bumping Lake (on Bumping River) near Nile, Wash., 1909; 1910–
        - Bumping River at Bumping Lake, near Nile, Wash., 1906; 1909–
            - American River near Nile, Wash., 1909; 1910; 1911; 1913; 1914; 1915.
        - Selah Valley canal near Naches, Wash., 1904–1906; 1909–1913.
        - Tieton River, North Fork, below Clear Creek, near Naches, Wash., 1914–
        - Tieton River at McAllister Meadows, near Naches, Wash., 1908–1914.
        - Tieton River at headworks of Tieton canal, near Naches, Wash., 1906–
        - Tieton River at Cobb's ranch, near Naches, Wash., 1902–1913.
            - Tieton canal near Naches, Wash., 1910–
        - Wapatox canal near Naches, Wash., 1904–5; 1909–11.
        - Naches Canal Co.'s (Gleed) canal near Naches, Wash., 1904–1906; 1909–1911.
        - Yakima Valley (Congdon) canal near Naches, Wash., 1904–1906; 1909–1911.
        - Naches-Cowiche canal near Naches, Wash., 1904–5; 1909–1911.
        - Yakima[1] power canal near Yakima,[1] Wash., 1904–1906; 1909–10.
            - Schanno canal near Yakima, Wash., 1904–5; 1909–1911.
            - Yakima[1] power waste at Yakima, Wash., 1909–1912.
            - Yakima[1] mill waste at Yakima, Wash., 1909–1912.
                - Naches Avenue Union canal at Yakima, Wash., 1904–1906; 1909–1911.
        - Old Union canal near Yakima, Wash., 1904–1906; 1909–1911.
        - Moxee Co.'s canal near Yakima, Wash., 1904–1906; 1909–1911.
        - Fowler canal near Yakima, Wash., 1904–1906; 1909–1911.
    - Ahtanum Creek, North Fork (head of Ahtanum Creek), near Tampico, Wash., 1907–
    - Ahtanum Creek at The Narrows, near Tampico, Wash., 1908–1913.

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[1] Decision of U. S. Geographic Board; formerly called North Yakima.

Columbia River tributaries—Continued.
- Yakima River tributaries—Continued.
  - Ahtanum Creek near Union Gap,[1] Wash., 1904; 1907–1912.
    - South Fork of Ahtanum Creek at Conrad ranch, near Tampico, Wash., 1915–
    - South Fork of Ahtanum Creek near Tampico, Wash., 1907–1914.
  - New Reservation canal near Parker (Union Gap), Wash., 1904–
  - Old Reservation canal near Parker (Wapato), Wash., 1904–
  - Sunnyside canal near Wapato, Wash., 1904–
  - Toppenish Creek near Fort Simcoe, Wash., 1909–
  - Toppenish Creek near White Swan (Wapato), Wash., 1909–1912.
  - Toppenish Creek at railway bridge, near Toppenish, Wash., 1894–1896.
  - Toppenish Creek near Toppenish, Wash., 1908–9.
  - Toppenish Creek at Alfalfa, Wash., 1909–1912.
    - Simcoe Creek near Fort Simcoe, Wash., 1909–
    - Reservation drain at Alfalfa, Wash., 1912–
  - Satus Creek near Toppenish, Wash., 1908–1913.
  - Satus Creek below mouth of Dry Creek, near Toppenish, Wash., 1913–
  - Satus Creek near Alfalfa, Wash., 1905.
  - Satus Creek near Satus, Wash., 1894–1896.
  - Kiona canal near Kiona, Wash., 1904–1906; 1908–1911.
  - Kennewick canal near Richland(Kennewick), Wash., 1904–5; 1910–11.
  - Lower Yakima canal near Kiona, Wash., 1905; 1910–11.
- Snake River at south boundary at Yellowstone National Park, 1913–
- Jackson Lake (Snake River) at Moran, Wyo., 1909–10 (fragmentary); 1911–
- Snake River [2] near Moran, Wyo., 1903–
- Snake River [2] at Grovont, Wyo., 1899.
- Snake River [2] near Lyon, Idaho, 1903–1911.
- Snake River [2] near Heise, Idaho, 1910–
- Snake River at Idaho Falls, Idaho, 1889–1890; 1892–1894.
- Snake River near Shelley, Idaho, 1915–
- Snake River near Firth, Idaho, 1915.
- Snake River near Blackfoot, Idaho, 1910–
- Snake River at Neeley, Idaho, 1906–
- Snake River at Howells Ferry, near Minidoka, Idaho, 1910–
- Snake River at Montgomery Ferry, near Minidoka, Idaho, 1895–1899; 1901–1910.
- Lake Milner (on Snake River) at Milner, Idaho, 1911–
- Snake River at Milner, Idaho, 1909–
- Snake River near Twin Falls, Idaho, 1911–
- Snake River near Hagerman, Idaho, 1912–
- Snake River at King Hill, Idaho, 1909–
- Snake River near Murphy, Idaho, 1912; 1913–
- Snake River at Weiser, Idaho, 1910–
- Snake River at Lewiston, Idaho, 1910.
- Snake River near Burbank, Wash., 1907–
  - Pacific Creek near Moran, Wyo., 1906.
  - Buffalo River near Elk, Wyo., 1906.
  - Henrys Fork [3] at Warm River, Idaho, 1910–1915.
  - Henrys Fork near Ora, Idaho, 1902–1909.
  - Henrys Fork in canyon above Fall River, Idaho, 1890–91.

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[1] Revised decision of U. S. Geographic Board rendered Jan. 2, 1918; formerly called Yakima City.

[2] Decision of United States Geographic Board; formerly called South Fork of Snake River.

[3] Decision of United States Geographic Board; formerly called North Fork of Snake River.

- Columbia River tributaries—Continued.
  - Snake River tributaries—Continued.
    - Henrys Fork near Rexburg, Idaho, 1909–
      - Warm River at Warm River, Idaho, 1912–1915.
        - Robinson Creek at Warm River, Idaho, 1912–1915.
      - Fall River near Marysville, Idaho, 1902–3.
      - Fall River at Fremont, Idaho, 1904–1909 (replace Marysville station).
      - Fall River at Canyon, Idaho, 1890–1901.
      - Teton River near St. Anthony, Idaho, 1903–1909.
      - Teton River at Chase's ranch, Idaho, 1890–1893.
    - Idaho (Government) canal near Shelley, Idaho, 1912–
    - Willow Creek near Prospect, Idaho, 1903–4.
    - Blackfoot River above the reservoir, near Henry, Idaho, 1914–
    - Blackfoot-Marsh reservoir near Henry, Idaho, 1912–
    - Blackfoot River below reservoir, near Henry [near Rossfork], Idaho, 1908–
    - Blackfoot River near Shelley, Idaho, 1909–
    - Blackfoot River near Presto, Idaho, 1903–1909.
    - Blackfoot River near Blackfoot, Idaho, (fragmentary), 1913; 1914; 1915–
      - Little Blackfoot River at Henry, Idaho, 1914–
        - Meadow Creek near Henry, Idaho, 1914–
    - Idaho (Government) canal near Firth, Idaho, 1914–
      - Fort Hall upper canal near Blackfoot, Idaho, 1912–
      - Fort Hall lower canal near Blackfoot, Idaho, 1912–
    - Big Lost River near Chilly, Idaho, 1904–1906; 1907–1915.
    - Big Lost River near Mackay, Idaho, 1903–1906; 1912–1915.
      - Thousand Springs Creek near Chilly, Idaho, 1912–13; 1914.
      - Sharp ditch near Mackay, Idaho, 1912–1914.
      - Streeter ditch near Mackay, Idaho, 1913–1914.
      - Cedar Creek above forks, near Mackay, Idaho, 1911–1913.
      - Cedar Creek below forks, near Mackay, Idaho, 1911–1913.
      - Antelope Creek near Darlington, Idaho, 1913–
      - Little Lost River near Clyde, Idaho, 1910–1913.
      - Birch Creek near Kaufman, Idaho, 1910–1912.
      - Camas Creek near Hamer, Idaho, 1912–13.
    - Portneuf River above reservoir, near Chesterfield, Idaho, 1912–1914.
    - Portneuf diversion channel near Chesterfield, Idaho, 1914.
    - Portneuf River below reservoir, near Chesterfield, Idaho, 1912–1915.
    - Portneuf River near Pebble, Idaho, 1910–1913.
    - Portneuf River at Topaz, Idaho, 1913–1915.
    - Portneuf River near McCammon, Idaho, 1896.
    - Portneuf River at Pocatello, Idaho, 1897–1899; 1911–
      - Topons Creek near Chesterfield, Idaho, 1912–1915.
      - Pebble Creek near Pebble, Idaho, 1911–1914.
      - Birch Creek near Downey, Idaho, 1911–1914.
    - Raft River near Bridge, Idaho, 1909–1915.
      - Clear Creek near Naf, Idaho, 1910–11; 1912.
      - Cassia Creek near Conant, Idaho, 1909–1912.
    - North Side Minidoka canal near Minidoka, Idaho, 1909–
    - South Side Minidoka canal near Minidoka, Idaho, 1909–
    - Goose Creek above Trapper Creek, near Oakley, Idaho, 1911–
    - Goose Creek near Oakley, Idaho, 1909–1911.
      - Trapper Creek near Oakley, Idaho, 1911–
      - Birch Creek near Oakley, Idaho, 1912–13; 1914–

- Columbia River tributaries—Continued.
  - Snake River tributaries—Continued.
    - North Side Twin Falls canal at Milner, Idaho, 1909–
    - South Side Twin Falls canal at Milner, Idaho, 1909–
    - Big Cottonwood Creek near Oakley, Idaho, 1909–
    - Dry Creek near Artesian City, Idaho, 1912.
    - Rock Creek near Rock Creek, Idaho, 1909–1913.
      - McMullen Creek near Rock Creek, Idaho, 1910; 1912.
    - Salmon Falls Creek above upper Vineyard ditch, near Contact, Nev., 1914.
    - Salmon Falls Creek below upper Vineyard ditch, near Contact, Nev., 1914.
    - Salmon Falls Creek below High Line canal, near San Jacinto, Nev., 1914.
    - Salmon Falls Creek near San Jacinto, Nev., 1909–
    - Salmon Falls Creek near Twin Falls, Idaho, 1909–10.
      - Upper Vineyard ditch near Contact, Nev., 1914.
      - Lower Vineyard ditch near Contact, Nev., 1914.
      - Jakes Creek above Hubbard ranch, near Contact, Nev., 1914.
      - Jakes Creek below Hubbard ranch, near Contact, Nev., 1914.
      - Willow Creek near Contact, Nev., 1914.
      - Bird's Nest ditch near Contact, Nev., 1914.
      - Harrell ditch near Contact, Nev., 1914.
      - High Line ditch near San Jacinto, Nev., 1914.
      - San Jacinto ditch near San Jacinto, Nev., 1914.
      - Island ditch near San Jacinto, Nev., 1914.
      - West Boar's Nest ditch near San Jacinto, Nev., 1914.
      - Trout Creek near San Jacinto, Nev., 1914.
      - East Boar's Nest ditch near San Jacinto, Nev., 1914.
      - Shoshone Creek near San Jacinto, Nev., 1914–15.
        - North Side ditch near San Jacinto, Nev., 1914.
      - Cedar Creek near Roseworth, Idaho, 1909–
      - Devil Creek near Three Creek, Idaho, 1912–1914.
    - Big Wood River near Gimlet, Idaho, 1904–5.
    - Big Wood River at Hailey, Idaho, 1889; 1915–
    - Big Wood Slough at Hailey, Idaho, 1915–
    - Big Wood River near Bellevue, Idaho, 1911–
    - Big Wood River below Magic dam, near Richfield, Idaho, 1911–
    - Big Wood River below North Gooding canal, near Shoshone, Idaho, 1911; 1912–
    - Big Wood River near Shoshone, Idaho, 1905–6; 1908–1913.
    - Big Wood River at Toponis, Idaho, 1896–1899.
    - Big Wood River near Bliss, Idaho, 1899.
      - Camas Creek near Blaine, Idaho, 1912–
      - Little Wood River near Carey, Idaho, 1904–5.
      - Little Wood River near Richfield, Idaho, 1911–
      - Little Wood River at Toponis [Gooding], Idaho, 1896–1899.
      - Dry Creek near Blanche, Idaho, 1911–1914.
    - King Hill Creek near King Hill, Idaho, 1913.
    - Little Canyon Creek at Glenns Ferry, Idaho, 1909–1913.
    - Alkali Creek near Glenns Ferry, Idaho, 1909–1913.
    - Cold Springs Creek near Hammett, Idaho, 1909–1913.
    - Bennett Creek near Hammett, Idaho, 1909–1913.
    - Bruneau River near Rowland, Nev., 1913–
    - Bruneau River near Tindall, Idaho, 1910–1912.
    - Bruneau River near Hot Spring, Idaho, 1909–1915.

- Columbia River tributaries—Continued.
  - Snake River tributaries—Continued.
    - Bruneau River near Grandview, Idaho, 1895–1903; 1909–
      - Sheep Creek near Tindall, Idaho, 1910–1913.
      - Marys Creek near Owyhee, Nev., 1913–1915.
      - Marys Creek at Tindall, Idaho, 1910–1913.
      - Louse Creek near Wickahoney, Idaho, 1911.
      - East Fork of Bruneau River near Three Creek, Idaho, 1912–1914.
      - East Fork of Bruneau River near Hot Spring, Idaho, 1910–1915.
        - Three Creek near Three Creek, Idaho, 1912–1914.
          - Cherry Creek near Three Creek, Idaho, 1912–1914.
          - Deadwood Creek near Three Creek, Idaho, 1912–1914.
      - Buckaroo ditch at Hot Spring, Idaho, 1912–1914.
      - Grandview canal near Grandview, Idaho, 1912–1915.
    - Castle Creek near Castle Creek, Idaho, 1910–11.
    - Sucker Creek near Homedale, Idaho, 1903–1910.
    - Owyhee River at Mountain City, Nev., 1913.
    - Owyhee River near Owyhee, Nev., 1913–
    - Owyhee River at Owyhee, Oreg., 1890–1896; 1903–
      - South Fork of Owyhee River near Tuscarora, Nev., 1913.
      - Jack Creek near Tuscarora, Nev., 1913–
      - Jordan Creek near Jordan Valley, Oreg., 1911–
        - Cow Creek at Narrows, near Jordan Valley, Oreg., 1914.
        - Cow Creek at mouth, near Jordan Valley, Oreg.. 1914.
      - Owyhee canal near Owyhee, Oreg., 1904–5; 1911–
    - Boise River near Twin Springs, Idaho, 1911–
    - Boise River at Dowling's ranch, near Arrowrock, Idaho, 1911–
    - Boise River near Highland, Idaho (replaces the Boise station), 1905–1915
    - Boise River near Boise, Idaho, 1894–1904.
    - Boise River at Caldwell, Idaho, 1895–96.
      - Cottonwood Creek near Arrowrock, Idaho, 1914–
      - South Fork of Boise River near Lenox, Idaho, 1911–
      - Little Camas Creek, near Little Camas Store, Idaho, 1896.
      - Moore Creek near Arrowrock, Idaho, 1915–
        - Grimes Creek near Centerville, Idaho, 1910.
      - Dry Creek:
        - Spring Creek near Boise, Idaho, 1911–12.
    - Wilson ditch near Ontario, Oreg., 1904–5.
    - Malheur River near Drewsey, Oreg., 1914.
    - Malheur River at Warmsprings reservoir site, near Riverside, Oreg., 1914–
    - Malheur River above South Fork, at Riverside, Oreg., 1906–7; 1908–1910.
    - Malheur River at Riverside, Oreg., 1909–1915.
    - Malheur River near Namorf, Oreg., 1913–
    - Malheur River near Harper ranch, near Westfall, Oreg., 1903–1905.
    - Malheur River near Little Valley, Oreg., 1914.
    - Malheur River at McLaughlin bridge, near Vale, Oreg., 1904–1906.
    - Malheur River at Vale, Oreg., 1890–91; 1895–96; 1903–1914.
    - Malheur River at Halliday bridge, near Ontario, Oreg., 1904–5.
    - Malheur River near Ontario, Oreg., 1903–4.
      - South Fork of Malheur River at Riverside, Oreg., 1910–1913; 1913–1915.
      - North Fork of Malheur River at Scotts ranch, near Beulah, Oreg., 1914.
      - North Fork of Malheur River at Foley's ranch, near Beulah, Oreg., 1909–1912; 1913–14.
      - Vines ditch near Little Valley, Oreg., 1904–5; 1914.

- Columbia River tributaries—Continued.
  - Snake River tributaries—Continued.
    - Malheur River tributaries—Continued.
      - Malheur Farmers' canal above Vale, Oreg., 1904–5.
      - McLaughlin ditch above Vale, Oreg., 1904–5.
      - "J. H." ditch above Vale, Oreg., 1904–5.
      - Gellerman & Frohman ditch above Vale, Oreg., 1904–5.
      - Sand Hollow ditch above Vale, Oreg., 1904–5.
      - Bully Creek near Westfall, Oreg., 1911; 1912–13.
      - Bully Creek at Warm Springs, near Vale, Oreg., 1903–4; 1905–1907; 1911–
      - Bully Creek at Vale, Oreg., 1904–5.
      - Hope Mill ditch at Vale, Oreg., 1904–5.
      - Willow Creek near Malheur, Oreg., 1904–6; 1910–11; 1912–
      - Willow Creek near Brogan, Oreg., 1910–
      - Willow Creek at Dell, Oreg., 1904–1906.
        - Cow Creek near Brogan, Oreg., 1912–1914.
        - Pole Creek near Brogan, Oreg., 1912–13.
      - Nevada ditch below Vale, Oreg., 1904–5.
    - Payette River near Horseshoe Bend, Idaho, 1906–
    - Payette River at Payette, Idaho, 1895–1897.
      - North Fork of Payette River at Lardo, Idaho, 1908–
      - North Fork of Payette River at Van Wyck, Idaho, 1912–
        - Lake Fork of Payette River near McCall, Idaho, 1909–1914.
      - Shafer Creek near Horseshoe Bend, Idaho, 1911–12.
        - Harris Creek near Horseshoe Bend, Idaho, 1911–12.
    - Weiser River near Weiser, Idaho, 1890–91; 1894–1904; 1910–1915.
      - Weiser River, West Fork, near Fruitvale, Idaho, 1910–1913.
        - Lost Creek near Tamarack, Idaho, 1910–1914.
      - Middle Fork of Weiser River at Middle Fork, Idaho, 1910–1913.
        - Sage Creek near Midvale, Idaho, 1913.
        - Sommercamp Creek near Midvale, Idaho, 1913.
        - Miller Creek near Midvale, Idaho, 1913.
      - Crane Creek near Midvale, Idaho, 1910–
      - Mann Creek near Weiser, Idaho, 1911–1913.
      - Monroe Creek (upper station) near Weiser, Idaho, 1911–12.
      - Monroe Creek (lower station) near Weiser, Idaho, 1911–1913.
    - Burnt River, North Fork (head of Burnt River), near Audrey, Oreg., 1915–
    - Burnt River near Hereford, Oreg., 1915–
    - Burnt River near Bridgeport, Oreg., 1915–
      - Middle Fork of Burnt River near Audrey, Oreg., 1915.
      - South Fork of Burnt River near Unity, Oreg., 1915–
        - Sawmill Creek near Unity, Oreg., 1915.
      - Camp Creek near Hereford, Oreg., 1915.
    - Powder River at Salisbury, Oreg., 1903–1914.
    - Powder River at Baker, Oreg., 1913; 1914.
    - Powder River near North Powder, Oreg., 1909–1912; 1913–
      - Baldock Slough at Baker, Oreg., 1913; 1914.
      - Old Settlers Slough at Baker, Oreg., 1913; 1914.
      - Pine Creek near Baker, Oreg., 1913; 1914.
        - Goodrich Creek near Baker, Oreg., 1913.
          - Mill Creek near Baker, Oreg., 1913; 1914.
            - Lee-Polly ditch near Baker, Oreg., 1914.
            - Marble Creek near Baker, Oreg., 1913; 1914.
        - Salmon Creek near Baker, Oreg., 1913; 1914.

- Columbia River tributaries—Continued.
  - Snake River tributaries—Continued.
    - Powder River tributaries—Continued.
      - Willow Creek near Haines, Oreg., 1913.
      - North Powder River at Gardner's ranch, near North Powder, Oreg., 1912.
      - North Powder River at North Powder, Oreg., 1912; 1913; 1914.
        - Anthony Creek near North Powder, Oreg., 1912.
      - Wolf Creek near North Powder, Oreg., 1913; 1914.
      - Big Creek near Medical Springs, Oreg., 1913; 1914.
      - Goose Creek near Keating, Oreg., 1913; 1914.
      - Eagle Creek above West Fork, near Baker, Oreg., 1911.
      - Eagle Creek near Baker, Oreg., 1909–10.
      - Eagle Creek near New Bridge, Oreg., 1910–11; 1914.
        - West Fork of Eagle Creek near Baker, Oreg., 1911.
      - Daly Creek near Richland, Oreg., 1913.
    - Salmon River near Pierson, Idaho, 1911–1913
    - Salmon River at Salmon, Idaho, 1912–
    - Salmon River at Whitebird, Idaho, 1910–
      - Lake Creek near Stanley, Idaho, 1910–1913.
      - Valley Creek near Stanley, Idaho, 1910–1913.
      - Pahsimeroi River near Goldburg, Idaho, 1910–1913.
      - Pahsimeroi River below the sinks, near Goldburg, Idaho, 1913.
        - Goldburg Creek near Goldburg, Idaho, 1910; 1913.
        - Big Creek near Patterson, Idaho, 1910–1913.
      - Lemhi River:
        - Timber Creek near Leadore, Idaho, 1912.
          - West Fork of Timber Creek near Leadore, Idaho, 1912.
        - Eightmile Creek near Leadore, Idaho, 1912.
      - North Fork of Salmon River near North Fork, Idaho, 1912.
    - Grande Ronde River at Hilgard, Oreg., 1903–1915.
    - Grande Ronde River at Elgin, Oreg., 1903–1912.
    - Grande Ronde River at Zindel, Wash., 1904–1912.
      - Catherine Creek near Union, Oreg., 1906–7; 1911–12; 1915.
        - Little Creek near Union, Oreg., 1915.
      - Mill Creek near Summerville, Oreg., 1914–15.
      - Wallowa Lake (on Wallowa River) near Joseph, Oreg., 1905–6; 1912–1914; 1915.
      - Wallowa River at Joseph, Oreg., 1903-1914; 1915.
      - Wallowa River near Wallowa, Oreg., 1903–1907.
      - Wallowa River at Minam (near Elgin), Oreg., 1903–1914.
        - Silver Lake ditch near Joseph, Oreg., 1905; 1915.
        - Farmers' and Citizens' ditch near Joseph, Oreg., 1905; 1915.
        - Granger ditch at Joseph, Oreg., 1905; 1915.
        - Big Bend ditch at Joseph, Oreg., 1905; 1915.
        - Hurricane Creek near Joseph, Oreg., 1915.
        - Lostine River near Lostine, Oreg., 1912–1914; 1915.
        - Company ditch near Wallowa, Oreg., 1905.
        - Bear Creek near Wallowa, Oreg., 1915.
        - Minam River at Minam, Oreg., 1912–1914.
    - Asotin Creek near Shelmans ranch, near Asotin, Wash., 1904-1906.
    - Asotin Creek near Asotin, Wash., 1904–5; 1910; 1911.
    - Selway River (head of Clearwater River), near Lowell, Idaho, 1911–12.
    - Clearwater River at Kamiah, Idaho, 1910–

- Columbia River tributaries—Continued.
  - Snake River tributaries—Continued.
    - Clearwater River at Lewiston, Idaho, 1910–1913.
      - Lochsa River near Lowell, Idaho, 1910–1912.
      - South Fork of Clearwater River near Grangeville, Idaho, 1910–
      - South Fork of Clearwater River at Kooskia, Idaho, 1910–1912.
      - Lolo Creek near Greer, Idaho, 1911–12.
    - Tucannon River near Pomeroy, Wash., 1913–1915.
    - Tucannon River near Starbuck, Wash., 1914–
    - Palouse River near Potlatch, Idaho, 1914–
    - Palouse River at Elberton, Wash., 1904–5.
    - Palouse River near Winona, Wash., 1915–
    - Palouse River at Hooper, Wash., 1897–
      - Rock Creek near Ewan (St. John), Wash., 1903–1905; 1914–
      - Cow Creek near Keystone, Wash., 1904–5.
      - Cow Creek near Hooper, Wash., 1904.
  - Walla Walla River near Milton, Oreg., 1903–1908.
  - Walla Walla River at Whitman, Wash., 1897–1899.
    - South Fork of Walla Walla River near Milton, Oreg., 1906; 1907–
    - South Fork of Walla Walla River near Milton, Oreg. (lower station), 1903–1906.
    - Mill Creek near Walla Walla, Wash., 1913–
  - Umatilla River at Gibbon, Oreg., 1896–1911.
  - Umatilla River at Pendleton, Oreg., 1891–2; 1903–1905.
  - Umatilla River above Furnish reservoir, near Yoakum, Oreg., 1915–
  - Umatilla River at Yoakum, Oreg., 1903–
  - Umatilla River near Umatilla, Oreg., 1903–
    - North Fork of Umatilla River near Gibbon, Oreg., 1912–
    - McKay Creek near Pendleton, Oreg., 1903–4.
    - Farmers' mill ditch at Pendleton, Oreg., 1905.
    - Slusher & Gould ditch near Nolin, Oreg., 1905–6.
    - Lisle & Crane ditch near Echo, Oreg., 1905.
    - Charles Lisle ditch at Echo, Oreg., 1905–6.
    - Henrietta mill ditch at Echo, Oreg., 1905–6.
    - Wilson & Co.'s ditch at Echo, Oreg., 1905–6.
    - Allen ditch at Echo, Oreg., 1905–6.
    - Western Land & Irrigation Co.'s (Hinkle) ditch at Echo, Oreg., 1905–6.
    - Pioneer ditch at Echo, Oreg., 1905–6.
    - Maxwell ditch at Echo, Oreg., 1905–6.
    - Maxwell Land & Irrigation Co.'s (Hermiston) ditch near Hermiston, Oreg., 1905–6.
    - Beitle ditch near Hermiston, Oreg., 1905–6.
    - Oregon Land & Water Co.'s ditch at Umatilla, Oreg., 1905–6.
    - Brownell ditch at Umatilla, Oreg., 1905–6.
  - Willow Creek near Arlington, Oreg., 1905–6.
  - Rock Creek near Goldendale, Wash., 1911–13.
    - Squaw Creek near Goldendale, Wash., 1911–13.
  - John Day River near Dayville, Oreg., 1908–1914.
  - John Day River at Clarno, Oreg., 1914–15
  - John Day River at McDonald, Oreg., 1904–
    - South Fork of John Day River at Dayville, Oreg., 1908–1914.
      - Dayville ditch at Dayville, Oreg., 1910–1914.
    - Camas Creek above Cable Creek, near Ukiah, Oreg., 1914–
    - Camas Creek below Cable Creek, near Ukiah, Oreg., 1914.
      - Cable Creek near Ukiah, Oreg., 1914–
    - Rock Creek at Rockcreek, Oreg., 1905; 1911.

- Columbia River tributaries—Continued.
    - Deschutes River at Crane Prairie, near Lapine, Oreg., 1914–
    - Deschutes River at Forest Service bridge, near Lapine, Oreg., 1910; 1912; 1913–
    - Deschutes River near Lava, Oreg., 1905–1907; 1909–1911; 1912; 1913–
    - Deschutes River at West's ranch, near Lava, Oreg., 1906–1909; 1914.
    - Deschutes River at Benham Falls, Oreg., 1909–1914.
    - Deschutes River at Lava Island, Oreg., 1915–
    - Deschutes River at Bend, Oreg., 1904–
    - Deschutes River below Bend, Oreg., 1914–
    - Deschutes River at Tumalo [Laidlaw], Oreg., 1909–1912; 1914–
    - Deschutes River near Cline Falls, Oreg., 1910–11; 1912–13.
    - Deschutes River near Mecca, Oreg., 1911–
    - Deschutes River at Sherar, Oreg., 1912–1914.
    - Deschutes River at Moro, Oreg., 1897–1899.
    - Deschutes River at Moody (Biggs), Oreg., 1906–
        - Odell Creek near Crescent, Oreg., 1911; 1912; 1913; 1914.
        - Fall River near Lapine, Oreg., 1912.
        - East Fork at Crescent, Oreg., 1904–1908; 1910–11; 1913–14.
        - East Fork at Morson's intake, near Lapine, Oreg., 1914–
        - East Fork near Lapine, Oreg., 1910–1913.
        - East Fork at Allen's ranch, near Lava, Oreg., 1905–1912; 1913–1915.
            - Crescent Creek at outlet of Crescent Lake, near Crescent, Oreg., 1911; 1912–
            - Crescent Creek below Cold Creek, near Crescent, Oreg., 1912–13.
            - Crescent Creek near Crescent, Oreg., 1912–13; 1914.
            - Big Marsh Creek near Crescent, Oreg., 1912–1914.
        - Arnold canal near Bend, Oreg., 1914–
        - Central Oregon canal near Bend, Oreg., 1905–
        - Pilot Butte canal near Bend, Oreg., 1905–
        - North canal near Bend, Oreg., 1913–
        - Swalley canal near Bend, Oreg., 1913–
        - Tumalo Creek near Tumalo [Laidlaw], Oreg., 1906–1914.
        - Tumalo Creek near Bend, Oreg., 1906–
            - Lewis Creek near Tumalo [Laidlaw], Oreg., 1908–9.
            - Wimer canal near Tumalo [Laidlaw], Oreg., 1906–1914.
            - Columbia Southern canal near Tumalo [Laidlaw], Oreg., 1906–1914.
            - Tumalo feed canal near Bend, Oreg., 1914–
        - Squaw Creek near Sisters, Oreg., 1906–
            - McAllister's ditch near Sisters, Oreg., 1909–1913.
        - Crooked River near Post, Oreg., 1908–1911.
        - Crooked River at Hoffman's ranch, near Prineville, Oreg., 1913–14.
        - Crooked River near Prineville, Oreg., 1908–1912.
        - Crooked River at Prineville, Oreg., 1914.
            - Prineville flour mill tailrace at Prineville, Oreg., 1914.
            - Ochoco Creek near Howard, Oreg., 1910–11.
            - Ochoco Creek at Elliot's ranch, near Prineville, Oreg., 1908–1910; 1914–
            - Ochoco Creek at Prineville, Oreg., 1912; 1913–1915
                - Tableland ditch near Prineville, Oreg., 1915–
                - Elliot ditch near Prineville, Oreg., 1908–1910; 1914–
            - McKay Creek near Prineville, Oreg., 1915–
        - Metolius River at Allingham ranger station, near Sisters, Oreg., 1910–1913 1915.
        - Metolius River at Hubbard's ranch, near Grandview, Oreg., 1910–1913.

- Columbia River tributaries—Continued.
  - Deschutes River tributaries—Continued.
    - Metolius River at Rigg's ranch, near Sisters, Oreg., 1908–1912.
      - Lake Creek near Sisters, Oreg., 1911–1913; 1915–
      - First Creek, near Sisters, Oreg., 1915–
      - Jack Creek near Sisters, Oreg., 1915–
      - Canyon Creek near Sisters, Oreg., 1915–
      - Whitewater River near Grandview, Oreg., 1911–1913.
    - Shitike Creek at Warmspring, Oreg., 1911–
    - Trout Creek near Antelope, Oreg., 1915.
    - Trout Creek near Gateway, Oreg., 1915.
      - Hay Creek near Hay Creek, Oreg., 1915.
    - Warm Springs River near Warmspring, Oreg., 1911–
    - Mill Creek near Warmspring, Oreg., 1915.
    - White River near Tygh Valley, Oreg., 1911–
      - Tygh Creek at Tygh Valley, Oreg., 1911–1913.
  - Klickitat River above Pearl Creek, near Glenwood, Wash., 1910.
  - Klickitat River above Big Muddy Creek, Wash., 1905.
  - Klickitat River below Big Muddy Creek, Wash., 1905; 1907–8.
  - Klickitat River at Camp Klickitat, Wash., 1907–1908.
  - Klickitat River near Glenwood, Wash., 1909–
  - Klickitat River below Glenwood, Wash., 1914.
  - Klickitat River at Hanson's cable, near Klickitat, Wash., 1908–9.
  - Klickitat River at Klickitat (Wright), Wash., 1909–1912.
  - Klickitat River at Wols Ferry, near Lyle, Wash., 1907–1910.
  - Klickitat River at Lyle, Wash., 1912.
    - West Fork of Klickitat River near Glenwood, Wash., 1910.
    - Big Muddy River above mouth of Cougar Creek, near Wright, Wash., 1905; 1908.
    - Little Klickitat River near Goldendale, Wash., 1910–1912.
  - Hood River at Dee, Oreg., 1913–
  - Hood River at Winans, Oreg., 1905–1907; 1910–1912; 1913.
  - Hood River at Tucker Bridge, Oreg., 1897–1899; 1913–
  - Hood River at Powerdale, near Hood River, Oreg., 1913–
    - East Fork of Hood River above intake, near Mount Hood, Oreg., 1915–
    - East Fork of Hood River near Mount Hood, Oreg., 1913–14.
      - East Fork irrigation district canal near Mount Hood, Oreg., 1913–
    - West Fork of Hood River near Dee, Oreg., 1913–
    - Pacific Light & Power Co. tailrace near Hood River, Oreg., 1914.
  - White Salmon River at splash dam near Trout Lake, Wash., 1912–
  - White Salmon River at Husum, Wash., 1909–
  - White Salmon River at Condit dam, near Underwood, Wash., 1912–13.
    - Trout Creek at Guler, Wash., 1909–1911.
  - Little White Salmon River below Lava Creek, near Cook, Wash., 1903–1906.[1]
  - Little White Salmon River near Cooks, Wash., 1909.
  - Latourell Creek at Latourell, Oreg., 1912–13.
  - Sandy River above Salmon River, at Brightwood, Oreg., 1910–1914.
  - Sandy River below Salmon River, near Brightwood, Oreg., 1907–1911.
  - Sandy River near Marmot, Oreg., 1911–
  - Sandy River above Bull Run River, near Bull Run, Oreg., 1910–1912.

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[1] Records published in U. S. Geol. Survey Water-Supply Paper 272, pp. 428–429.

- Columbia River tributaries—Continued.
  - Sandy River below Bull Run River, near Bull Run, Oreg., 1910–1914.
    - Clear Fork of Sandy River near Welches, Oreg., 1913; 1914–15.
    - Lost Creek near Brightwood, Oreg., 1913–
    - Still Creek near Rowe, Oreg., 1910–1912.
    - Salmon River near Rowe, Oreg., 1910–1912.
    - Salmon River at Welches, Oreg., 1913–14.
    - Salmon River at Fish Hatchery, near Brightwood, Oreg., 1912–13.
    - Bull Run River near Bull Run, Oreg., 1895–
      - Little Sandy River near Marmot, Oreg., 1913–
      - Little Sandy River near Bull Run, Oreg., 1911–1913.
        - Little Sandy flume near Bull Run, Oreg., 1912–13.
  - Willamette River, Middle Fork (head of Willamette River), above Salt Creek, near Oakridge, Oreg., 1913–14.
  - Willamette River, Middle Fork, below North Fork, near Oakridge, Oreg., 1911–12.
  - Willamette River, Middle Fork, at Jasper, Oreg., 1905–1912; 1913–
  - Willamette River at Springfield, Oreg., 1911–1913.
  - Willamette River at Albany, Oreg., 1878–1880; 1892–
  - Willamette River at Salem, Oreg., 1909–
  - Willamette River at Oregon City, Oreg., 1909–1912.
    - Salt Creek near Oakridge, Oreg., 1913–14.
    - Salmon Creek near Oakridge, Oreg., 1913–
    - North Fork of Middle Fork of Willamette River near Oakridge (Hazeldell), Oreg., 1909–1912; 1913–
    - Fall Creek near Fall Creek, Oreg., 1911.
    - Coast Fork of Willamette River near Goshen, Oreg., 1905–1912.
      - Row River near Disston, Oreg., 1910–1913.
    - McKenzie River at Clear Lake, Oreg., 1912–1915.
    - McKenzie River at McKenzie Bridge, Oreg., 1910–
    - McKenzie River at Martins Rapids, Oreg., 1910–11.
    - McKenzie River near Springfield, Oreg., 1905–1915.
      - Eugene power canal near Walterville, Oreg., 1912–1915.
    - North Santiam River near Hoover, Oreg., 1910–13.
    - North Santiam River at Detroit, Oreg., 1907–1909.
    - North Santiam River at Niagara, Oreg., 1908–
    - North Santiam River at Mehama, Oreg., 1905–1907; 1910–1914.
    - Santiam River at Jefferson, Oreg., 1905–6; 1908–
      - Marion Fork of Santiam River at Marion Lake, near Hoover, Oreg., 1907; 1909–1912.
        - Puzzle Creek near Detroit (Hoover), Oreg., 1907; 1909.
          - North Fork of Puzzle Creek near Hoover, Oreg., 1909–1912.
          - South Fork of Puzzle Creek near Hoover, Oreg., 1909–1912.
      - Pamelia Creek near Detroit, Oreg., 1907; 1909; 1913.
      - Whitewater Creek near Detroit, Oreg., 1907; 1913.
      - Breitenbush Creek near Detroit, Oreg., 1910–1913.
      - South Santiam River near Cascadia, Oreg., 1910–1913.
      - South Santiam River near Foster, Oreg., 1911.
      - South Santiam River at Waterloo, Oreg., 1905–1907; 1910–11.
        - Middle Santiam River near Foster, Oreg., 1911.
    - Luckiamute River near Suver, Oreg., 1905–1911.
    - Yamhill River, South Fork (head of Yamhill River), at Sheridan, Oreg., 1906–1913.
    - Yamhill River at La Fayette, Oreg., 1908–1914.

Columbia River tributaries—Continued.
  Willamette River tributaries—Continued.
    Molalla River near Molalla, Oreg., 1905–1909–
    Clackamas River near Cazadero, Oreg., 1909–
    Clackamas River at Estacada, Oreg., 1908–1911.
    Clackamas River near Barton, Oreg. (replaced by Estacada station), 1905–1908.
    Clackamas River at Park Place, Oreg., 1911–12.
      Oak Grove Fork of Clackamas River at Timothy Meadows, near Cazadero, Oreg., 1913–
      Oak Grove Fork of Clackamas River at intake, near Cazadero, Oreg. 1909–
  Lewis River above Muddy River near Cougar, Wash., 1909.
  Lewis River near Cougar, Wash., 1909–1912.
  Lewis River near Amboy, Wash., 1911–
  Lewis River at Ariel, Wash., 1909.
    Muddy River at mouth, near Cougar, Wash., 1909.
    Pine Creek at mouth, near Cougar, Wash., 1909.
    Swift Creek at mouth, near Cougar, Wash., 1909.
  Kalama River near Kalama, Wash., 1911–1913.
  Ohanapecosh River near Lewis, Wash., 1907–
  Cowlitz River at Lewis, Wash., 1911–
  Cowlitz River at Mossy Rock, Wash., 1912–
  Cowlitz River at Randle, Wash., 1910–1912.
  Cowlitz River at Mayfield, Wash., 1910–11.
    Clear Fork near Lewis, Wash., 1907–
    Coal Creek near Lewis, Wash., 1911–
    Lake Creek at outlet of Packwood Lake, near Lewis, Wash., 1911–
    Lake Creek at mouth, near Lewis, Wash., 1907–
    Johnson Creek below West Fork, near Lewis, Wash., 1911; 1913–14.
    Johnson Creek at mouth, near Lewis, Wash., 1907–1914.
    Glacier Creek near Lewis, Wash., 1911.
    Hagar Creek near Lewis, Wash., 1911–12; 1913–14.
      North Fork of Hagar Creek near Lewis, Wash., 1911–12; 1913–14.
    Cispus River near Randle, Wash., 1910–1912.
    Toutle River at St. Helen, Wash., 1909.
    Toutle River near Castle Rock, Wash., 1909–1912.

STREAMS BETWEEN COLUMBIA RIVER AND KLAMATH RIVER.

Rogue River near Prospect, Oreg., 1907–1912.
Rogue River below Prospect, Oreg., 1913–
Rogue River near Trail, Oreg., 1910–1913.
Rogue River near Tolo, Oreg., 1905–
Rogue River near Galice, Oreg., 1906.
  Mill Creek near Prospect, Oreg., 1910.
  Butte Creek, South Fork (head of Butte Creek), at Butte Falls, Oreg., 1910–11; 1915–
  Little Butte Creek, South Fork (head of Little Butte Creek), near Lake Creek, Oreg., 1910–1913.
  Little Butte Creek near Eagle Point, Oreg., 1907–
    Rogue River Valley canal at intake, near Lake Creek, Oreg., 1914; 1915–
    Rogue River Valley canal near Brownsboro, Oreg., 1913; 1915.
    North Fork of Little Butte Creek, near Lake Creek, Oreg., 1911–1913.

- Rogue River tributaries—Continued.
    - Bear Creek at Talent, Oreg., 1907–1914.
    - Bear Creek at Medford, Oreg., 1915–
        - Neil Creek near Ashland, Oreg., 1913.
            - George Dunn ditch near Ashland, Oreg., 1913.
        - Ashland Creek at Ashland, Oreg., 1913.
        - Wagner Creek near Talent, Oreg., 1913.
    - Evans Creek at Wimer, Oreg., 1913.
    - Applegate River near Buncom, Oreg., 1911–1914.
    - Applegate River at Murphy, Oreg., 1907–1910.
        - Cameron ditch near Buncom, Oreg., 1911–1914.
        - East Fork of Little Applegate River near Buncom, Oreg., 1913.
        - Little Applegate River near Ruch, Oreg., 1913.
            - West Fork of Little Applegate River near Buncom, Oreg., 1913.
                - Spicer ditch near Buncom, Oreg., 1913.
            - Thompson Creek near Applegate, Oreg., 1913.
            - Slate Creek at Wonder, Oreg., 1913.
        - Grave Creek near Placer, Oreg., 1913.
- South Umpqua River (head of Umpqua River) near Tiller, Oreg., 1910–11.
- South Umpqua River near Brockway, Oreg., 1905–1912.
- Umpqua River near Elkton, Oreg., 1905–
    - Cow Creek at Riddle, Oreg., 1911–12.
    - North Umpqua River at Tokeetee Falls, near Hoaglin, Oreg., 1908–1909; 1914–
    - North Umpqua River near Hoaglin, Oreg., 1910–1912; 1914–
    - North Umpqua River near Oakcreek, Oreg., 1905–1908; 1913–1915.
    - North Umpqua River at Winchester, Oreg., 1908–1913.
    - Calapooya Creek near Sutherlin, Oreg., 1912–13.
        - Luse canal near Sutherlin, Oreg., 1912–13.
    - Mill Creek near Ash, Oreg., 1907–1912; 1915–
- Siletz River at Siletz, Oreg., 1905–1912.
- Wilson River near Tillamook, Oreg., 1915–
    - North Fork of Wilson River near Tillamook, Oreg., 1913–1915.
- Nehalem River at Salmonberry, near Balm, Oreg., 1913–14.

REPORTS ON WATER RESOURCES OF THE NORTH PACIFIC SLOPE DRAINAGE BASINS.

PUBLICATIONS OF UNITED STATES GEOLOGICAL SURVEY.

WATER-SUPPLY PAPERS.

Water-supply papers are distributed free by the Geological Survey as long as its stock lasts. An asterisk (*) indicates that this stock has been exhausted. Many of the papers marked in this way may, however, be purchased (at price noted) from the SUPERINTENDENT OF DOCUMENTS, Washington, D. C. Omission of the price indicates that the report is not obtainable from Government sources. Water-supply papers are of octavo size.

*4. A reconnaissance in southeastern Washington, by I. C. Russell, 1897. 96 pp., 7 pls. 15c.

Describes an area "bordered on the south by Oregon, on the east by Idaho, on the north by Snake River, and on the west by the Columbia," and "briefly designated as lying south of Snake River"; discusses climate, vegetation, topography and drainage, geologic formations—including the river terraces and soils—irrigation, and the artesian water supply, and gives an outline of the geological history of the region.

*44. Profiles of rivers in the United States, by Henry Gannett. 1901. 100 pp., 11 pls. 15c.

Gives elevations and distances along Columbia, Willamette, Flathead, and Snake rivers.

*53. Geology and water resources of Nez Perce County, Idaho, Part I, by I. C. Russell. 1901. 85 pp., 10 pls. 10c.

*54. Geology and water resources of Nez Perce County, Idaho, Part II, by I. C. Russell. 1901. 55 pp. (87-141).

Nos. 53 and 54 relate to an area "in western Idaho, bordered on the west by portions of Washington and Oregon," drained through Snake River to the Columbia; they describe the topography, geology, and soils of the region, discuss the relation of the surface features—plateaus, canyons, streams, etc.—to the geology and the climate, the source and quantity of the water supply, including springs and artesian wells, and refer briefly to the occurrence of building stones, lignite, gold, silver, and copper. They include also a short bibliography of artesian waters and two appendixes—one giving list of elevations, and the other notes concerning Portland cement.

55. Geology and water resources of a portion of Yakima County, Wash., by G. O. Smith. 1901. 68 pp., 7 pls. 10c.

Describes topography, climate, soil, agriculture, geology, and surface and ground waters of an area comprising about 50 square miles in the vicinity of North Yakima; discusses in some detail the artesian basins and wells.

*57. Preliminary list of deep borings in the United States, Part I (Alabama-Montana), by N. H. Darton. 1902. 60 pp. 5c.

*61. Preliminary list of deep borings in the United States, Part II (Nebraska-Wyoming), by N. H. Darton. 1902. 67 pp. 5c.

Nos. 57 and 61 contain information as to depth, diameter, yield, and head of water in borings more than 400 feet deep; under head "Remarks" gives information concerning temperature, quality of water, purposes of boring, etc. The lists are arranged by States, and the States are arranged alphabetically. A second, revised, edition was published in 1905 as Water-Supply Paper 149 (q. v.). 5c.

*78. Preliminary report on artesian basins in southwestern Idaho and southeastern Oregon, by I. C. Russell. 1903. 53 pp., 2 pls. 5c.

Discusses briefly the rocks and geologic structure of a part of the Snake River Plains in Canyon and Owyhee counties, Idaho, and Malheur and Harney counties, Oreg.; describes briefly the conditions on which artesian flow depends, and in some detail the springs and drilled wells in the Lewis, Otis, Harney, and Whitehorse artesian basins; also describes artesian wells in alluvial deposits and discusses the size of drill holes, casings, etc., the preservation of well records, and the importance of laws to control the use of artesian waters; gives list of publications bearing on artesian waters.

93. Proceedings of first conference of engineers of the Reclamation Service, with accompanying papers, compiled by F. H. Newell, chief engineer, 1904. 361 pp. 25c. [Inquiries concerning this report should be addressed to the Reclamation Service.] Contains:

Investigations in Idaho, by D. W. Ross. Describes the irrigable lands in the area drained by Snake River.

Investigations in Oregon, by J. T. Whistler. Mentions the Umatilla, Malheur, and Harney projects.

Work in Washington, by T. A. Noble. Describes the plains of Columbia River.

96. Destructive floods in the United States in 1903, by E. C. Murphy. 1904. 81 pp., 13 pls. 15c.

Gives an account of a flood (commonly spoken of as the "Heppner disaster") on Willow Creek, a tributary of Columbia River, in Morrow County, Oreg.

*103. A review of the laws forbidding pollution of inland waters in the United States, by E. B. Goodell. 1904. 120 pp. [Superseded by No. 152, q. v.]

Cites statutory restrictions of water pollution in Idaho, Nevada, Oregon, Utah, Washington, and Wyoming.

111. Preliminary report on the underground waters of Washington, by Henry Landes. 1905. 85 pp., 1 pl. 10c.

Describes, by counties, the municipal water supplies, deep wells, and springs in the State, giving also for each county a brief account of the climate, rainfall, topography, drainage, and geology.

118. Geology and water resources of a portion of east-central Washington, by F. C. Calkins. 1905. 96 pp., 4 pls. 5c.

Describes briefly the topography, geology, climate, vegetation, grazing, and agriculture on the Columbia Plains and in Kittitas Valley; discusses the streams, springs, and shallow and deep wells.

*122. Relation of the law to underground waters, by D. W. Johnson. 1905. 55 pp. 5c.

Cites legislative acts relating to ground waters in Idaho, Nevada, Oregon, Utah, Washington, and Wyoming.

149. Preliminary list of deep borings in the United States, second edition, with additions, by N. H. Darton. 1905. 175 pp. 10c.

Gives, by States (and within the States by counties), location, depth, diameter, yield, height of water, and other available information, concerning wells 400 feet or more in depth; includes all wells listed in Water-Supply Papers 57 and 61; mentions also principal publications relating to deep borings.

152. A review of the laws forbidding pollution of inland waters in the United States (second edition), by E. B. Goodell. 1905. 149 pp. 10c.

Cites statutory restrictions of water pollution in Idaho, Nevada, Oregon, Utah, Washington, and Wyoming.

*162. Destructive floods in the United States in 1905, with a discussion of flood discharge and frequency and an index to flood literature, by E. C. Murphy and others. 1906. 105 pp., 4 pls. 15c.

Gives estimates (p. 85) of flood discharge and frequency for Boise River at Boise and Weiser River at Weiser, Idaho.

*231. Geology and water resources of the Harney Basin region, Oregon, by G. A. Waring. 1909. 93 pp., 5 pls. 25c.

The greater part of the area covered by this report is in the Great Basin, but a small tract in the northeastern corner is drained by a number of small streams that are tributary to Malheur River.

253. Water powers of the Cascade Range, Part I, Southern Washington, by J. C. Stevens. 1910. 94 pp., 21 pls. 40c.

Discusses conditions governing hydraulic development, water laws of Washington, and variations in streams; describes the drainage basins of Klickitat, White Salmon, Little White Salmon, Lewis, and Toutle rivers; gives results of observations at gaging stations, and estimates of average minimum discharge and of the available horsepower at the power sites.

274. Some stream waters of the western United States, with chapters on sediment carried by the Rio Grande and the industrial application of water analyses, by Herman Stabler. 1911. 188 pp. 15c.

Describes collection of samples, plan of analytical work, and methods of analyses; discusses soap-consuming power of waters, water softening, boiler waters, and water for irrigation; gives results of analyses of waters of Boise, Malheur, Payette, and Palouse rivers, and Salmon Creek

313. Water powers of the Cascade Range, Part II, Cowlitz, Nisqually, Puyallup, White, Green, and Cedar drainage basins, by F. F. Henshaw and G. L. Parker. 1913. 170 pp., 16 pls. 55c.

Describes the geologic features and history of the drainage basins, topography and drainage, soils and vegetation, and precipitation; gives stream-flow records and discusses water powers storage, and power sites; discusses also natural resources and harbors of the Pacific coast, central electric stations, and power utilization, and gives commercial and residential rates. See also 253.

316. Geology and water resources of a portion of south-central Washington, by G. A. Waring. 1913. 46 pp., 1 pl. 5c.

Describes settlements, climate and vegetation, agriculture, grazing, geographic provinces, relation of surface features and structure, and geology; discusses shallow and artesian waters and irrigation enterprises in Sunnyside and Reservation valleys, Horse Heaven Plateau, and the Columbia River Plains, and irrigation along lower Yakima River; gives tabulated data concerning wells and springs.

339. Quality of the surface waters of Washington, by Walton Van Winkle. 1914. 105 pp., 2 pls. 15c.

Discusses briefly the natural and economic features of the State, the constituents and uses of the natural waters, purification of water, methods of analysis, and industrial and geochemical interpretation of the results of analysis; describes the general features of the principal drainage basins and gives the results of an investigation of the character of the river waters; treats briefly of the average chemical composition of river water, the economic value of the rivers, denudation, and the influence of natural features on the character of the waters.

344. Deschutes River, Oregon, and its utilization, by F. F. Henshaw, John H. Lewis, and E. J. McCaustland. 1914. 200 pp., 28 pls. 50c.

A report, prepared in cooperation with the State of Oregon, containing the results of measurements of stream flow, a discussion of the economic distribution of the water, and chapters on the quality of the water, the availability of the water supply, the developed water powers, undeveloped power sites, water rights and appropriations, the relation of the Federal Government to the development of water power, and Government permits for power and reservoir sites.

346. Profile surveys in the basin of Clark Fork of Columbia River, Montana-Idaho-Washington, prepared under the direction of R. B. Marshall, chief geographer. 1914. 6 pp., 3 pls. (22 sheets). 50c.

347. Profile surveys in Snake River basin, Idaho, prepared under the direction of R. B. Marshall, chief geographer. 1914. 12 pp., 3 pls. (37 sheets). 55c.

348. Profile surveys in Hood and Sandy River basins, Oregon, prepared under the direction of R. B. Marshall, chief geographer. 1914. 8 pp., 2 pls. (6 sheets). 30c.

349. Profile surveys in Willamette River, Oregon, prepared under the direction of R. B. Marshall, chief geographer. 1914. 8 pp., 3 pls. (16 sheets). 30c.

363. Quality of the surface waters of Oregon, by W. Van Winkle. 1914. 137 pp., 2 pls. 20c.

Describes the topography, drainage, rocks and soils, climate, population, and industries of the State, the constituents of natural waters, water for domestic and industrial uses, and purification of water, methods of analysis, and interpretation of results of analysis; describes the general features of the river basins and the character of the river waters; discusses the conditions influencing the quality of the surface waters, average chemical composition, geochemical character, denudation, industrial value, and value for irrigation.

364. Water analyses from the laboratory of the United States Geological Survey, tabulated by F. W. Clarke, chief chemist. 1914. 40 pp. 5c.

Contains analyses of Soap and Omak lakes, Wash., and of mine waters from Butte, Mont.

366. Profile surveys of Snoqualmie, Sultan, and Skykomish rivers, Washington, prepared under the direction of R. B. Marshall, chief geographer. 1914. 7 pp., 3 pls. (12 sheets). 20c.

368. Profile surveys in Wenatchee River basin, Washington, prepared under the direction of R. B. Marshall, chief geographer. 1914. 7 pp., 1 pl. (8 sheets). 20c.

369. Water powers of the Cascade Range, Part III, Yakima River basin, by G. L. Parker and F. B. Storey, 1916. 169 pp., 20 pls 45c.

Describes the geography of the basins, the geologic history, physiography and river history, climate, settlement, and development, population, and transportation; gives stream-flow records and discusses natural conditions affecting stream flow, storage reservoirs, developed and undeveloped power sites; treats also of the industrial development of the region, discussing irrigation by gravity systems and by pumping, the production of coal and other minerals, and manufacturing; presents a scheme of development and utilization of stored water. The report was prepared under the direction of the Washington State Board of Geological Survey, and is based on data consisting of "stream-flow records, river plans and profiles, reservoir surveys, and field reconnaissances of the rivers and their various tributaries," obtained by the United States Geological Survey and the United States Reclamation Service, supplemented by a large amount of information furnished by private parties.

370. Surface water supply of Oregon, 1878–1910, by F. F. Henshaw and H. J. Dean. 1915. 829 pp., 1 pl. 45c.

Describes briefly the natural features of Oregon and in greater detail the general features of the river basins; consists principally of records of stream flow that have been carefully studied and recomputed when necessary to insure their best possible interpretation.

376. Profile surveys in Chelan and Methow River basins, Washington, prepared under the direction of R. B. Marshall, chief geographer. 1915. 8 pp., 5 pls. 15c.

377. Profile surveys in Spokane River basin, Washington, and John Day River basin, Oregon, prepared under the direction of R. B. Marshall, chief geographer. 1915. 7 pp., 10 pls. 15c.

378. Profile surveys in 1914 on Middle Fork of Willamette River and White River, Oregon, prepared under the direction of R. B. Marshall, chief geographer. 1915. 8 pp., 6 pls. 15c.

379. Profile surveys in 1914 in Umpqua River basin, Oregon, prepared under the direction of R. B. Marshall, chief geographer. 1915. 7 pp., 13 pls. 20c.

*400. Contributions to the hydrology of the United States, 1916, Nathan C. Grover, chief hydraulic engineer, 1917. 108 pp., 7 pls. 15c. Contains:

(*b*) Artesian water for irrigation in Little Bitterroot Valley, Mont., by O. E. Meinzer.

419. Profile surveys in 1915 in Skagit River basin, Washington, prepared under the direction of W. H. Herron, acting chief geographer. 1916. 8 pp., 12 pls. 15c.

420. Profile surveys along Henrys Fork, Idaho, and Logan River and Blacksmith Fork, Utah. prepared under the direction of W. H. Herron, acting chief geographer. 1916. 8 pp., 10 pls. 10c.

425. Contributions to the hydrology of the United States, 1917, N. C. Grover, chief hydraulic engineer, 1918. Contains:

(*e*) Ground water in Quincy Valley, Wash., by A. T. Schwennesen and O. E. Meinzer.

BULLETINS.

An asterisk (*) indicates that the Geological Survey's stock of the paper is exhausted. Many of the papers so marked may be purchased from the SUPERINTENDENT OF DOCUMENTS, WASHINGTON, D. C. Bulletins are of octavo size.

*199. Geology and water resources of the Snake River Plains of Idaho, by I. C. Russell. 1902. 192 pp., 25 pls. 25c.

Describes the topography, geology, climate, vegetation, fauna, and soils of an area extending entirely across the southern part of Idaho; discusses streams, springs, water powers, irrigation and agriculture, industries, and routes of transportation and highways; treats of the origin of surface and subsurface waters, the requisite conditions for artesian wells and the quantity of water available.

252. Preliminary report on the geology and water resources of central Oregon, by I. C. Russell. 1905. 138 pp., 24 pls. 15c.

Describes a portion of the extreme northern part of the Great Basin and a part of the drainage area of Deschutes River and its principal tributary, Crooked River; gives an account of the topography, drainage, rainfall and temperature, winds, and forests; describes the volcanicsedimentary rock formations, and discusses by counties the geology and topography, the surface and ground waters; treats of artesian conditions in the Deschutes basin and makes suggestions concerning artesian-well records.

*264. Record of deep-well drilling for 1904, by M. L. Fuller, E. F. Lines, and A. C. Veatch. 1905. 106 pp. 10c.

*298. Record of deep-well drilling for 1905, by M. L. Fuller and Samuel Sanford. 1906. 299 pp. 25c.

Bulletins 264 and 298 give an account of progress in the collection of well records and samples, and contain tabulated records of wells in Idaho, Montana, Nevada, Oregon, Washington, and Wyoming. No. 298 gives detailed records of wells in Flathead County, Mont., and Benton, Jefferson, and Walla Walla counties, Wash. The wells of which detailed sections are given were selected because they afford valuable stratigraphic information.

ANNUAL REPORTS.

Each of the papers contained in the annual reports was also issued in separate form.

Annual reports are distributed free by the Geological Survey as long as its stock lasts. An asterisk (*) indicates that this stock has been exhausted. Many of the papers so marked, however, may be purchased from the SUPERINTENDENT OF DOCUMENTS, WASHINGTON, D. C.

*Tenth Annual Report of the Director of the United States Geological Survey, 1888–89, J. W. Powell, Director. 1890. 2 parts. *Pt. II. Irrigation, viii, 123 pp. 35c.

Makes a preliminary report on the organization and prosecution of the survey of the arid lands for purposes of irrigation; includes an account of the methods of topographic and hydraulic work, the segregation work on reservoir sites and irrigable lands, field and office methods, and brief descriptions of the topography of some of the river basins.

Eleventh Annual Report of the United States Geological Survey, 1889–90, J. W. Powell, Director. 1891. 2 parts. Pt. II. Irrigation, xiv, 395 pp. 30 pls. and maps. $1.25. Contains:

*Hydrography, pp. 1-110. Discusses scope of work, methods of stream measurement, rainfall and evaporation, and describes the more important streams.

*Engineering, pp. 111-200. Defines the scope of the work and gives an account of the survey in the Sun River basin and in the Arkansas, Rio Grande, California, Lahontan, Utah, and Snake River divisions.

*Topography, pp. 291–343. Comprises reports of the topographic surveys in California, Nevada, Colorado, Idaho, Montana, and New Mexico, and a report on reservoir sites.

*Irrigation literature, pp. 345–388. Gives a list of books and pamphlets on irrigation and allied subjects, mainly contained in the library of the United States Geological Survey.

Twelfth Annual Report of the Director of the United States Geological Survey, 1890–91, J. W. Powell, Director. 1891. 2 parts. Pt. II, Irrigation, xviii, 576 pp., 93 pls. $2. Contains:

*Hydrography of the arid regions, by F. H. Newell, pp. 213-301, Pls. 58-106. Discusses the available water supply of the arid regions, the duty of water, flood waters, relation of rainfall to river flow; classifies the drainage basins; and describes the rivers of the Missouri, Arkansas, Rio Grande, Colorado, Sacramento, and San Joaquin basins, and the principal streams of the Great Basin in Nevada and Utah and the Snake River basin.

Thirteenth Annual Report of the United States Geological Survey, 1891–92, J. W. Powell, Director. 1892. (Pts. II and III, 1893.) 3 parts. *Pt. III. Irrigation, xi, 486 pp., 77 pls. $1.85. Contains:

*Engineering results of irrigation survey, by H. M. Wilson, pp. 351-427, Pls. 147-182. Describes structures on the Pocatello canal, Idaho.

Sixteenth Annual Report of the United States Geological Survey, 1894–95, Charles D. Walcott, Director. 1896. (Pts. II, III, and IV, 1895.) 4 parts. *Pt. II. Papers of an economic character, xix, 598 pp., 43 pls. $1.25. Contains:

The public lands and their water supply, by F. H. Newell, pp. 457–533, Pls. 35–39. Describes general character of the public lands, the lands disposed of (railroad, grant, and swamp lands, and private miscellaneous entries), lands reserved (Indian, forest, and military reservations), the vacant lands, and the rate of disposal of vacant lands; discusses the streams, wells, and reservoirs as sources of water supply; gives details for each State.

Nineteenth Annual Report of the United States Geological Survey, 1897–98, Charles D. Walcott, Director. 1898. (Pts. II, III, and V, 1899.) 6 parts in 7 vols. and separate case for maps with Pt. V. *Pt. V, Forest reserves, xvii, 400 pp., 110 pls. $1.25. 16 maps in separate case, 75c. Contains:

*Priest River Forest Reserve, by J. B. Leiberg, pp. 217-252, Pls. 48-61.
*Bitterroot Forest Reserve, by J. B. Leiberg, pp. 253-282, Pls. 62-73.
*Washington Forest Reserve, by H. B. Ayres, pp. 283-313, Pls. 76-100.
*Eastern part of Washington Forest Reserve, by M. W. Gorman, pp. 315-350, Pl. 101.
*Forest conditions of northern Idaho, by J. B. Leiberg, pp. 373-386, Pls. 109-110.
These reports describe the topography and the streams of the forest reserves.

Twentieth Annual Report of the United States Geological Survey, 1898–99, Charles D. Walcott, Director. 1899. (Pts. II, III, IV, V, and VII, 1900.) 7 parts in 8 vols. and separate case for maps with Pt. V. *Pt. V, Forest reserves, xix, 498 pp., 159 pls., 8 maps in separate case. $2.80. Contains:

*The Flathead Forest Reserve, by H. B. Ayres, pp. 245-316, Pls. 77-113.

*Bitterroot Forest Reserve, by J. B. Leiberg, pp. 317-409, Pls. 115-142. Contains brief descriptions of the streams and lakes in the reserves.

Twenty-first Annual Report of the United States Geological Survey, 1899–1900, Charles D. Walcott, Director. 1900. (Pts. III, IV, VI, VI continued, and VII, 1901.) 7 parts in 8 vols. and separate case for maps with Pt. V. *Pt. V, Forest reserves, 711 pp., 143 pls., 39 maps in separate case. $3.85. Contains:

*Mount Rainier Forest Reserve, Washington, by F. G. Plummer, pp. 81-143, Pls. 33-50.

*Olympic Forest Reserve, Washington, from field notes by Arthur Dodwell and T. F. Rixon, pp. 145-208, Pls. 51-70.

*Cascade Range Forest Reserve, Oregon, from T. 28 S. to T. 37 S., inclusive, together with the Ashland Forest Reserve and adjacent forest regions from T. 28 S. to T. 41 S., inclusive, and from R. 2 W. to R. 14 E., Willamette meridian, inclusive, by J. B. Leiberg, pp. 209-498, Pls. 71-84. Contains descriptions of many of the streams flowing through the forest reserves.

GEOLOGIC FOLIOS.

Under the plan adopted for the preparation of a geologic map of the United States the entire area is divided into small quadrangles, bounded by certain meridians and parallels, and these quadrangles, which number several thousand, are separately surveyed and mapped.[1] The unit of survey is also the unit of publication, and the maps and description of each quadrangle are issued in the form of a folio. When all the folios are completed they will constitute the Geologic Atlas of the United States.

A folio is designated by the name of the principal town or of a prominent natural feature within the quadrangle. Each folio includes maps showing the topography, geology, underground structure, and mineral deposits of the area mapped and several pages of descriptive text. The text explains the maps and describes the topographic and geologic features of the country and its mineral products. The topographic map shows roads, railroads, waterways, and, by contour lines, the shapes of the hills and valleys and the height above sea level of all points in the quadrangle. The areal-geology map shows the distribution of the various rocks at the surface. The structural-geology map shows the relations of the rocks to one another underground. The economic-geology map indicates the location of mineral deposits that are commercially valuable. The artesian-water map shows the depth to underground-water horizons. Economic-geology and artesian-water maps are included in folios if the conditions in the areas mapped warrant their publication. The folios are of special interest to students of geography and geology and are valuable as guides in the development and utilization of mineral resources.

The folios numbered from 1 to 163, inclusive, are published in only one form (18 by 22 inches), called the library edition. Some of the folios that bear numbers higher than 163 are published also in an octavo edition (6 by 9 inches). Owing to a fire in the Geological Survey Building May 18, 1913, the stock of geologic folios was more or less damaged by fire and water, but the folios are usable and are sold at the uniform price of 5 cents each, with no reduction for wholesale orders. This rate applies to folios in stock from 1 to 184, inclusive (except reprints), also the library edition of folio 186. The library edition of folios 185, 187, and higher numbers sells for 25 cents a copy, except that some folios which contain an unusually large amount of matter sell at higher prices. The octavo edition of folio 185 and higher numbers sells for 50 cents a copy except folio 193, which sells for 75 cents a copy. If 34 folios selling at 25 cents each (or their equivalent in higher-priced folios) are ordered at one time a discount of 40 per cent is allowed; $5.10 is the minimum amount accepted at this rate.

All the folios contain descriptions of the drainage of the quadrangles. The folios in the following list contain also brief discussions of the underground waters in connection with the economic resources of the areas and more or less information concerning the utilization of the water resources.

An asterisk (*) indicates that the stock of the folio is exhausted.

*45. Boise, Idaho.

Describes geography and geology, cold springs and cold artesian waters, and hot springs and hot artesian waters.

103. Nampa, Idaho-Oregon. 5c.

Describes the relief, drainage, climate, and vegetation of the area; discusses the geologic history and geologic formations, and, under "Economic geology," the surface waters available for irrigation, the springs and shallow wells, and the artesian wells; indicates areas of possible artesian flow.

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[1] Index maps showing areas in the North Pacific slope basins covered by topographic maps and by geologic folios will be mailed on receipt of request addressed to the Director, U. S. Geological Survey, Washington, D. C.

104. Silver City, Idaho. 5c.

Describes the relief, drainage, climate, vegetation, and culture of the Silver City quadrangle; discusses the geologic history and the geologic formations, and, under "Economic geology," the surface waters available for irrigation or water-power development, warm springs, and artesian wells; notes possible chances for artesian waters; gives records of wells near Enterprise and Guffey; see also Water-Supply Paper 78.

*139. Snoqualmie, Washington.

Describes the relief and drainage of an area including portions of Kittitas, Yakima, Pierce, and King counties; the statigraphic, structural, and historical geology, and, under "Economic geology," includes a brief paragraph on the utilization of the water supply.

MISCELLANEOUS REPORTS.

Other Federal bureaus and State and other organizations have from time to time published reports relating to the water resources of various sections of the country. Notable among those pertaining to the northern Pacific coast drainage basins are the reports of the commissioner of conservation of the State of Montana; the State land commission; the State engineer of Idaho; the Bureau of Industry, Agriculture, and Irrigation of Nevada; the State engineers of Nevada, Oregon, Utah, and Washington; the annual reports of the United States Reclamation Service; and the reports of the Chief of Engineers, U. S. Army. The following reports deserve special mention:

The Oregon system of water titles, by John H. Lewis: Oregon State Engineer Bull. 2, 1912.

State and National water laws, with a detailed statement of the Oregon system of water titles, by John H. Lewis, with a discussion by Clarence T. Johnston and L. J. Le Conte: Am. Soc. Civil Eng. Trans., vol. 76, pp. 637–758, 1913.

Report of the commission on conservation [State of Montana] on bills relating to public lands, water rights, and the protection and preservation of the forests: Helena, 1911; also report of the governor of the State of Montana on the same subject.

How to appropriate the public waters of the State of Nevada, compiled by W. M. Kearney, State engineer, 1911.

Requirements and regulations, including suggestions and instructions in relation to the appropriation, use, and measurement of water in the State of Nevada: State engineer of Nevada, 1912.

Irrigation pumping in Nevada, etc., by Charles Norcross: Nevada Bur. of Industry, Agr., and Irr. Bull. 8, 1913.

The water resources of Washington: Potable and mineral water, by H. G. Byers; artesian water, by C. A. Ruddy; water power, by R. E. Heine: Washington Geol. Survey Ann. Rept. for 1901, vol. 1, pt. 5, 1902.

Preliminary report on the Quincy Valley irrigation project, by Henry Landes and others: Washington Geol. Survey Bull. 14, 1912.

Biennial Report of the State Commissioner of Arid Lands [Washington], 1895–96 and 1897–98.

The irrigated lands of the State of Washington, by George M. Allen, deputy commissioner: State Bureau of Statistics and Immigration, 1910.

Irrigation laws of the State of Wyoming, prepared for publication in the office of the State engineer, 1909.

GEOLOGICAL SURVEY HYDROLOGIC REPORTS OF GENERAL INTEREST.

The following list comprises reports not readily classifiable by drainage basins and covering a wide range of hydrologic investigations:

WATER-SUPPLY PAPERS.

*1. Pumping water for irrigation, by H. M. Wilson. 1896. 56 pp., 9 pls.

Describes pumps and motive powers, windmills, water wheels, and various kinds of engines; also storage reservoirs to retain pumped water until needed for irrigation.

*3. Sewage irrigation, by G. W. Rafter. 1897. 100 pp., 4 pls. (See Water-Supply Paper 22.) 10c.

Discusses methods of sewage disposal by intermittent filtration and by irrigation; describes utilization of sewage in Germany, England, and France, and sewage purification in the United States.

*8. Windmills for irrigation, by E. C. Murphy. 1897. 49 pp., 8 pls. 10c.

Gives results of experimental tests of windmills during the summer of 1896 in the vicinity of Garden, Kans.; describes instruments and methods and draws conclusions.

*14. New tests of certain pumps and water lifts used in irrigation, by O. P. Hood, 1898. 91 pp., 1 pl.

Discusses efficiency of pumps and water lifts of various types.

*20. Experiments with windmills, by T. O. Perry. 1899. 97 pp., 12 pls. 15c.

Includes tables and descriptions of wind wheels, compares wheels of several types, and discusses results.

*22. Sewage irrigation, Part II, by G. W. Rafter. 1899. 100 pp., 7 pls. 15c.

Gives résumé of Water-Supply Paper 3; discusses pollution of certain streams, experiments on purification of factory wastes in Massachusetts, value of commercial fertilizers, and describes American sewage-disposal plants by States; contains bibliography of publications relating to sewage utilization and disposal.

*41. The windmill, its efficiency and economic use, Part I, by E. C. Murphy. 1901. 72 pp., 14 pls. 5c.

*42. The windmill, its efficiency and economic use, Part II, by E. C. Murphy. 1901. 75 pp. (73–147), 2 pls., (15–16). 10c.

Nos. 41 and 42 give details of results of experimental tests with windmills of various types

*43. Conveyance of water in irrigation canals, flumes, and pipes, by Samuel Fortier. 1901. 86 pp., 15 pls. 15c.

*56. Methods of stream measurement. 1901. 51 pp., 12 pls. 15c.

Describes the methods used by the Survey in 1901–2. See also Nos. 64, 94, and 95.

*64. Accuracy of stream measurements, by E. C. Murphy. 1902. 99 pp., 4 pls. (See No. 95.) 10c.

Describes methods of measuring velocity of water and of measuring and computing stream flow and compares results obtained with the different instruments and methods; describes also experiments and results at the Cornell University hydraulic laboratory. A second, enlarged, edition published as Water-Supply Paper 95.

*67. The motions of underground waters, by C. S. Slichter. 1902. 106 pp., 8 pls. 15c.

Discusses origin, depth, and amount of ground waters; permeability of rocks and porosity of soils; causes, rates, and laws of motions of ground water; surface and deep zones of flow, and recovery of waters by open wells and artesian and deep wells; treats of the shape and position of the water table; gives simple methods of measuring yield of flowing well; describes artesian wells at Savannah, Ga.

72. Sewage pollution in the metropolitan area near New York City and its effect on inland water resources, by M. O. Leighton. 1902. 75 pp., 8 pls. 10c.

Defines "normal" and "polluted" waters and discusses the damage resulting from pollution.

*80. The relation of rainfall to run-off, by G. W. Rafter. 1903. 104 pp. 10c.

Treats of measurements of rainfall and laws and measurements of stream flow; gives rainfall, run-off, and evaporation formulas; discusses effects of forests on rainfall and run-off.

87. Irrigation in India (second edition), by H. M. Wilson. 1903. 238 pp., 27 pls. 25c.

First edition was published in Part II of the Twelfth Annual Report.

93. Proceedings of first conference of engineers of the Reclamation Service, with accompanying papers, compiled by F. H. Newell, chief engineer. 1904. 361 pp. 25c. [Requests for this paper should be addressed to the U. S. Reclamation Service.]

Contains, in addition to an account of the organization of the hydrographic [water-resources] branch of the United States Geological Survey and the reports of the conference, the following papers of more or less general interest:

Limits of an irrigation project, by D. W. Ross.
Relation of Federal and State laws to irrigation, by Morris Bien.
Electrical transmission of power for pumping, by H. A. Storrs.
Correct design and stability of high masonry dams, by Geo. Y. Wisner.
Irrigation surveys and the use of the plane table, by J. B. Lippincott.
The use of alkaline waters for irrigation, by Thomas H. Means.

*94. Hydrographic manual of the United States Geological Survey, prepared by E. C. Murphy, J. C. Hoyt, and G. B. Hollister. 1904. 76 pp., 3 pls. 10c.

Gives instruction for field and office work relating to measurements of stream flow by current meters. See also No. 95.

*95. Accuracy of stream measurements (second, enlarged edition), by E. C. Murphy. 1904. 169 pp., 6 pls.

Describes methods of measuring and computing stream flow and compares results derived from different instruments and methods. See also No. 94.

*103. A review of the laws forbidding pollution of inland waters in the United States, by E. B. Goodell. 1904. 120 pp. (See No. 152.)

Explains the legal principles under which antipollution statutes become operative, quotes court decisions to show authority for various deductions, and classifies according to scope the statutes enacted in the different States.

110. Contributions to the hydrology of eastern United States, 1904; M. L. Fuller, geologist in charge. 1905. 211 pp., 5 pls. 10c.

Contains the following reports of general interest. The scope of each paper is indicated by its title.

Description of underflow meter used in measuring the velocity and direction of underground water, by Charles S. Slichter.

The California or "stovepipe" method of well construction, by Charles S. Slichter.

Approximate methods of measuring the yield of flowing wells, by Charles S. Slichter.

Corrections necessary in accurate determinations of flow from vertical well casings, from notes furnished by A. N. Talbot.

Experiments relating to problems of well contamination at Quitman, Ga., by S. W. McCallie.

113. The disposal of strawboard and oil-well wastes, by R. L. Sackett and Isaiah Bowman. 1905. 52 pp., 4 pls. 5c.

The first paper discusses the pollution of streams by sewage and by trade wastes, describes the manufacture of strawboard, and gives results of various experiments in disposing of the waste. The second paper describes briefly the topography, drainage, and geology of the region about Marion, Ind., the contamination of rock wells and of streams by waste oil and brine.

*114. Underground waters of eastern United States; M. L. Fuller, geologist in charge. 1905. 285 pp., 18 pls. 25c.

Contains report on "Occurrence of underground waters," by M. L. Fuller, discussing sources amount, and temperature of waters, permeability and storage capacity of rocks, water-bearing formations, recovery of water by springs, wells, and pumps, essential conditions of artesian flows, and general conditions affecting ground waters in eastern United States.

119. Index to the hydrographic progress reports of the United States Geological. Survey, 1888 to 1903, by J. C. Hoyt and B. D. Wood. 1905. 253 pp. 15c.

120. Bibliographic review and index of papers relating to underground waters published by the United States Geological Survey, 1879–1904, by M. L. Fuller. 1905. 128 pp. 10c.

*122. Relation of the law to underground waters, by D. W. Johnson. 1905. 55 pp. 5c

Defines and classifies underground waters, gives common-law rules relating to their use, and cites State legislative acts affecting them.

140. Field measurements of the rate of movement of underground waters, by C. S. Slichter. 1905. 122 pp., 15 pls. 15c.

Discusses the capacity of sand to transmit water, describes measurements of underflow in Rio Hondo, San Gabriel, and Mohave River valleys, Cal., and on Long Island, N. Y., gives results of tests of wells and pumping plants, and describes stovepipe method of well construction.

143. Experiments on steel-concrete pipes on a working scale, by J. H. Quinton. 1905. 61 pp., 4 pls. 5c.

Scope indicated by title.

145. Contributions to the hydrology of eastern United States, 1905; M. L. Fuller, geologist in charge. 1905. 220 pp., 6 pls. 10c.

Contains brief reports of general interest as follows:

Drainage of ponds into drilled wells, by Robert E. Horton.. Discusses efficiency, cost, and capacity of drainage wells, and gives statistics of such wells in southern Michigan.

Construction of so-called fountain and geyser springs, by Myron L. Fuller.

A convenient gage for determining low artesian heads, by Myron L. Fuller.

146. Proceedings of second conference of engineers of the Reclamation Service, with accompanying papers, compiled by F. H. Newell, chief engineer. 1905. 267 pp. 15 c. [Inquiries concerning this report should be addressed to the U. S. Reclamation Service.]

Contains brief account of the organization of the hydrographic [water-resources] branch and the Reclamation Service, reports of conferences and committees, circulars of instruction, and many brief reports on subjects closely related to reclamation, and a bibliography of technical papers by members of the service. Of the papers read at the conference those listed below (scope indicated by title) are of more or less general interest:

Proposed State code of water laws, by Morris Bien.
Power engineering applied to irrigation problems, by O. H. Ensign.
Estimates on tunneling in irrigation projects, by A. L. Fellows.
Collection of stream-gaging data, by N. C. Grover.
Diamond-drill methods, by G. A. Hammond.
Mean-velocity and area curves, by F. W. Hanna.
Importance of general hydrographic data concerning basins of streams gaged by R. E. Horton
Effect of aquatic vegetation on stream flow, by R. E. Horton.
Sanitary regulations governing construction camps, by M. O. Leighton.
Necessity of draining irrigated land, by Thos. H. Means.
Alkali soils, by Thos. H. Means.

Cost of stream-gaging work, by E. C. Murphy.
Equipment of a cable gaging station, by E. C. Murphy.
Silting of reservoirs, by W. M. Reed.
Farm-unit classification, by D. W. Ross.
Cost of power for pumping irrigating water, by H. A. Storrs.
Records of flow at current-meter gaging stations during the frozen season, by F. H. Tillinghast.

147. Destructive floods in the United States in 1904, by E. C. Murphy and others. 1905. 206 pp., 18 pls. 15c.

Contains a brief account of "A method of computing cross-section area of waterways," including formulas for maximum discharge and area of cross section.

*150. Weir experiments, coefficients, and formulas, by R. E. Horton. 1906. 189 pp., 38 pls. (See Water-Supply Paper 200.) 15c.

Scope indicated by title.

151. Field assay of water, by M. O. Leighton. 1905. 77 pp., 4 pls.

Discusses methods, instruments, and reagents used in determining turbidity, color, iron, chlorides, and hardness in connection with the studies of the quality of water in various parts of the United States.

152. A review of the laws forbidding pollution of inland waters in the United States (second edition), by E. B. Goodell. 1905. 149 pp. 10c.

Scope indicated by title.

*155. Fluctuations of the water level in wells, with special reference to Long Island, N. Y., by A. C. Veatch. 1906. 83 pp., 9 pls. 25c.

Includes general discussion of fluctuation changes due to rainfall and evaporation, barometric changes, temperature changes, changes in rivers, changes in lake level, tidal changes, effects of settlement, irrigation, dams, underground-water developments, and to indeterminate causes.

*160. Underground-water papers, 1906; M. L. Fuller, geologist in charge. 1906. 104 pp., 1 pl.

Gives account of work in 1905; lists publications relating to ground waters, and contains the following brief reports of general interest:
Significance of the term "artesian," by Myron L. Fuller.
Representation of wells and springs on maps, by Myron L. Fuller.
Total amount of free water in the earth's crust, by Myron L. Fuller.
Use of fluorescein in the study of underground waters, by R. B. Dole.
Problems of water contamination, by Isaiah Bowman.
Instances of improvement of water in wells, by Myron L. Fuller.

*162. Destructive floods in the United States in 1905, with a discussion of flood discharge and frequency and an index to flood literature, by E. C. Murphy and others. 1906. 105 pp., 4 pls. 15c.

*163. Bibliographic review and index of underground-water literature published in the United States in 1905, by M. L. Fuller, F. G. Clapp, and B. L. Johnson. 1906. 130 pp. 15c.

Scope indicated by title.

*179. Prevention of stream pollution by distillery refuse, based on investigations at Lynchburg, Ohio, by Herman Stabler. 1906. 34 pp., 1 pl. 10c.

Describes grain distillation; treatment of slop; sources, character, and effects of effluents on streams; discusses filtration, precipitation, fermentation, and evaporation methods of disposal of wastes without pollution.

*180. Turbine water-wheel tests and power tables, by R. E. Horton. 1906. 134 pp., 2 pls. 20c.

Scope indicated by title.

*185. Investigations on the purification of Boston sewage, by C.-E. A. Winslow and E. B. Phelps. 1906. 163 pp. 25c.

Discusses composition, disposal, purification, and treatment of sewages and tendencies in sewage-disposal practice in England, Germany, and the United States; describes character of crude sewage at Boston, removal of suspended matter, treatment in septic tanks, and purification in intermittent sand filtration and coarse material; gives bibliography.

*186. Stream pollution by acid-iron wastes, a report based on investigations made at Shelby, Ohio, by Herman Stabler. 1906. 36 pp., 1 pl.

Gives history of pollution by acid-iron wastes at Shelby, Ohio, and resulting litigation; discusses effect of acid-iron liquors on sewage purification processes, recovery of copperas from acid-iron wastes, and other processes for removal of pickling liquor.

*187. Determination of stream flow during the frozen season, by H. K. Barrows and R. E. Horton. 1907. 93 pp., 1 pl. 15c.

Scope indicated by title.

*189. The prevention of stream pollution by strawboard waste, by E. B. Phelps. 1906. 29 pp., 2 pls.

Describes manufacture of strawboard, present and proposed methods of disposal of waste liquors, laboratory investigations of precipitation and sedimentation, and field studies of amount and character of water used, raw material and finished product, and mechanical filtration.

*194. Pollution of Illinois and Mississippi rivers by Chicago sewage (a digest of the testimony taken in the case of the State of Missouri *v.* the State of Illinois and the Sanitary District of Chicago), by M. O. Leighton. 1907. 369 pp., 2 pls.

Scope indicated by amplification of title.

*200. Weir experiments, coefficients, and formulas (revision of paper No. 150), by R. E. Horton. 1907. 195 pp., 38 pls. 35c.

Scope indicated by title.

*226. The pollution of streams by sulphite-pulp waste, a study of possible remedies, by E. B. Phelps. 1909. 37 pp., 1 pl. 10c.

Describes manufacture of sulphite pulp, the waste liquors, and the experimental work leading to suggestions as to methods of preventing stream pollution.

*229. The disinfection of sewage and sewage filter effluents, with a chapter on the putrescibility and stability of sewage effluents, by E. B. Phelps. 1909. 91 pp., 1 pl. 15c.

Scope indicated by title.

*234. Papers on the conservation of water resources. 1909. 96 pp., 2 pls. 15c.

Contains the following papers, whose scope is indicated by their titles: Distribution of rainfall by Henry Gannett; Floods, by M. O. Leighton; Developed water powers, compiled under the direction of W. M. Steuart, with discussion by M. O. Leighton; Undeveloped water powers, by M. O. Leighton; Irrigation, by F. H. Newell; Underground waters, by W. C. Mendenhall; Denudation, by R. B. Dole and Herman Stabler; Control of catchment areas, by H. N. Parker.

*235. The purification of some textile and other factory wastes, by Herman Stabler and G. H. Pratt. 1909. 76 pp. 10c.

Discusses waste waters from wool scouring, bleaching and dyeing cotton yarn, bleaching cotton piece goods, and manufacture of oleomargarine, fertilizer, and glue.

236. The quality of surface waters in the United States, Part I, Analyses of waters east of the one hundredth meridian, by R. B. Dole. 1909. 123 pp. 10c.

Describes collection of samples, methods of examination, preparation of solutions, accuracy of estimates, and expression of analytical results.

238. The public utility of water powers and their governmental regulation, by René Tavernier and M. O. Leighton. 1910. 161 pp. 15c.

Discusses hydraulic power and irrigation, French, Italian, and Swiss legislation relative to the development of water powers, and laws proposed in the French Parliament; reviews work of bureau of hydraulics and agricultural improvements of the French department of agriculture, and gives résumé of Federal and State water-power legislation in the United States.

*255. Underground waters for farm use, by M. L. Fuller. 1910. 58 pp., 17 pls. 15c.

Discusses rocks as sources of water supply and the relative safety of supplies from different materials; springs and their protection; open or dug and deep wells, their location, yield, relative cost, protection, and safety; advantages and disadvantages of cisterns and combination wells and cisterns.

*257. Well-drilling methods, by Isaiah Bowman. 1911. 139 pp., 4 pls. 15c.

Discusses amount, distribution, and disposal of rainfall; water-bearing rocks; amount of ground water; artesian conditions; oil and gas bearing formations; gives history of well drilling in Asia, Europe, and the United States; describes in detail the various methods and the machinery used; discusses loss of tools and geologic difficulties, contamination of well waters and methods of prevention, tests of capacity and measurement of depth, and costs of sinking wells.

*258. Underground-water papers, 1910, by M. L. Fuller, F. G. Clapp, G. C. Matson, Samuel Sanford, and H. C. Wolff. 1911. 123 pp., 2 pls. 15c.

Contains the following papers (scope indicated by titles) of general interest:
Drainage by wells, by M. L. Fuller.
Freezing of wells and related phenomena, by M. L. Fuller.
Pollution of underground waters in limestone, by G. C. Matson.
Protection of shallow wells in sandy deposits, by M. L. Fuller.
Magnetic wells, by M. L. Fuller.

*315. The purification of public water supplies, by G. A. Johnson. 1913. 84 pp., 8 pls. 10c.

Discusses ground, lake, and river waters as public supplies, development of waterworks systems in the United States, water consumption, and typhoid fever; describes methods of filtration and sterilization of water and municipal water softening.

334. The Ohio Valley flood of March-April, 1913 (including comparisons with some earlier floods), by A. H. Horton and H. J. Jackson. 1913. 96 pp., 22 pls. 20c.

Although relating specifically to floods in the Ohio Valley, this report discusses also the causes of floods and the prevention of damage by floods.

337. The effects of ice on stream flow, by William Glenn Hoyt. 1913. 77 pp., 7 pls. 15c.

Discusses methods of measuring the winter flow of streams.

*345. Contributions to the hydrology of the United States, 1914; N. C. Grover, chief hydraulic engineer. 1915. 225 pp., 17 pls. 30c. Contains:

(*e*) A method of determining the daily discharge of rivers of variable slope, by M. R. Hall, W. E. Hall, and C. H. Pierce, pp. 53–65.

364. Water analyses from the laboratory of the United States Geological Survey, tabulated by F. W. Clarke, chief chemist. 1914. 40 pp. 5c.

Contains analyses of waters from rivers, lakes, wells, and springs in various parts of the United States, including analyses of the geyser water of Yellowstone National Park, hot springs in Montana, brines from Death Valley, water from the Gulf of Mexico, and mine waters from Tennessee, Michigan, Missouri and Oklahoma, Montana, Colorado and Utah, Nevada and Arizona, and California.

371. Equipment for current-meter gaging stations, by G. J. Lyon. 1915. 64 pp., 37 pls. 20c.

Describes methods of installing automatic and other gages and of constructing gage wells shelters, and structures for making discharge measurements and artificial controls.

*375. Contributions to the hydrology of the United States, 1915; N. C. Grover, chief hydraulic engineer. 1916. 181 pp., 9 pls. 15c. Contains:

(*c*) The relation of stream gaging to the science of hydraulics, by C. H. Pierce and R. W. Davenport, pp. 77–84.

(*e*) A method of correcting river discharge for a changing stage, by B. E. Jones, pp. 117-130.

(*f*) Conditions requiring the use of automatic gages in obtaining records of stream flow, by C. H. Pierce, pp. 131–139.

Three papers presented at the conference of engineers of the water-resources branch in December, 1914.

*400. Contributions to the hydrology of the United States, 1916; N. C. Grover, chief hydraulic engineer. 108 pp., 7 pls. Contains:

(*a*) The people's interest in water-power resources, by G. O. Smith, pp. 1–8.

(*c*) The measurement of silt-laden streams, by R. C. Pierce, pp. 39–51.

(*d*) Accuracy of stream-flow data, by N. C. Grover and J. C. Hoyt, pp. 53–59.

416. The divining rod, a history of water witching, with a bibliography, by Arthur J. Ellis. 1917. 59 pp. 10c.

A brief paper published "merely to furnish a reply to the numerous inquiries that are continually being received from all parts of the country" as to the efficacy of the divining rod for locating underground water.

425. Contributions to the hydrology of the United States, 1917, N. C. Grover, chief hydraulic engineer. 1918. Contains:

*(*c*) Hydraulic conversion tables and convenient equivalents, pp. 71–94. 1917.

ANNUAL REPORTS.

*Fifth Annual Report of the United States Geological Survey, 1883–84, J. W. Powell, Director. 1885. xxxvi, 469 pp., 58 pls. $2.25. Contains:

*The requisite and qualifying conditions of artesian wells, by T. C. Chamberlin, pp. 125–173, pl. 21. Scope indicated by title.

Twelfth Annual Report of the United States Geological Survey, 1890–91, J. W. Powell, Director. 1891. 2 parts. Pt. II, Irrigation, xviii, 576 pp., 93 pls. $2. Contains:

*Irrigation in India, by H. M. Wilson, pp. 363–561, pls. 107 to 146. See Water-Supply Paper 87.

Thirteenth Annual Report of the United States Geological Survey, 1891–92, J. W. Powell, Director. 1892. (Pts. II and III, 1893.) 3 parts. *Pt. III, Irrigation, xi, 486 pp., 77 pls. $1.85. Contains:

*American irrigation engineering, by H. M. Wilson, pp. 101–349, pls. 111 to 146. Discusses the economical aspects of irrigation, alkaline drainage, silt, and sedimentation; gives brief history of legislation; describes perennial canals in Idaho, California, Wyoming, and Arizona; discusses water storage at reservoirs of the California and other projects, subsurface sources of supply, pumping, and subirrigation.

Fourteenth Annual Report of the United States Geological Survey, 1892–93, J. W. Powell, Director. 1893. (Pt. II, 1894.) 2 parts. *Pt. II, Accompanying papers, xx, 597 pp., 73 pls. $2.10. Contains:

*The potable waters of eastern United States, by W J McGee, pp. 1–47. Discusses cistern water, stream waters, and ground waters, including mineral springs and artesian wells.

*Natural mineral waters of the United States, by A. C. Peale, pp. 49–88, pls. 3 and 4. Discusses the origin and flow of mineral springs, the source of mineralization, thermal springs, the chemical composition and analysis of spring waters, geographic distribution, and the utilization of mineral waters; gives a list of American mineral-spring resorts; contains also some analyses.

Nineteenth Annual Report of the United States Geological Survey, 1897-98, Charles D. Walcott, Director. 1898. (Parts II, III, and V, 1899.) 6 parts in 7 vols. and separate case for maps with Pt. V. *Pt. II, Papers chiefly of a theoretic nature, v, 958 pp., 172 pls. $2.65. Contains:

*Principles and conditions of the movements of ground water, by F. H. King, pp. 59-294, pls. 6 to 16. Discusses the amount of waters stored in sandstone, in soil, and in other rocks, and the depth to which ground water penetrates; gravitational, thermal, and capillary movements of ground waters, and the configuration of the ground-water surface; gives the results of experimental investigations on the flow of air and water through a rigid, porous medium, and through sand, sandstones, and silts; discusses results obtained by other investigators, and summarizes results of observations; discusses also rate of flow of water through sand and rock, the growth of rivers, rate of filtration through soil, interference of wells, etc.

*Theoretical investigation of the motion of ground waters, by C. S. Slichter, pp. 295-384, pl. 17. Scope indicated by title.

PROFESSIONAL PAPERS.

*72. Denudation and erosion in the southern Appalachian region and the Monongahela basin, by L. C. Glenn. 1911. 137 pp., 21 pls. 35c.

Describes the topography, geology, drainage, forests, climate, and population, and transportation facilities of the region, the relation of agriculture, lumbering, mining, and power development to erosion and denudation, and the nature, effects, and remedies of erosion; gives details of conditions in Holston, Nolichucky, French Broad, Little Tennessee, and Hiwassee River basins, along Tennessee River proper, and in the basins of the Coosa-Alabama system, Chattahoochee, Savannah, Saluda, Broad, Catawba, Yadkin, New, and Monongahela rivers.

86. The transportation of débris by running water, by G. K. Gilbert, based on experiments made with the assistance of E. C. Murphy. 1914. 263 pp., 3 pls. 70c.

The results of an investigation which was carried on in a specially equipped laboratory at Berkeley, Cal., and was undertaken for the purpose of learning "the laws which control the movement of bed load and especially to determine how the quantity of load is related to the stream slope and discharge and to the degree of comminution of the débris."

105. Hydraulic-mining débris in the Sierra Nevada, by G. K. Gilbert. 154 pp., 34 pls. 1917. 50c.

Presents the results of an investigation undertaken by the United States Geological Survey in response to a memorial from the California Miners' Association asking that a particular study be made of portions of the Sacramento and San Joaquin valleys affected by detritus from torrential streams. The report deals largely with geologic and physiographic aspects of the subject, traces the physical effects, past and future, of the hydraulic mining of earlier decades, the similar effects which certain other industries induce through stimulation of the erosion of the soil, and the influence of the restriction of the area of inundation by the construction of levees. Suggests cooperation by several interests for the control of the streams now carrying heavy loads of débris.

BULLETINS.

*32. Lists and analyses of the mineral springs of the United States (a preliminary study), by A. C. Peale. 1886. 235 pp.

Defines mineral waters, lists the springs by States, and gives tables of analyses so far as available.

*319. Summary of the controlling factors of artesian flows, by Myron L. Fuller. 1908. 44 pp., 7 pls. 10c.

Describes underground reservoirs, the sources of ground waters, the confining agents, the primary and modifying factors of artesian circulation, the essential and modifying factors of artesian flow, and typical artesian systems.

*479. The geochemical interpretation of water analyses, by Chase Palmer. 1911. 31 pp. 5c.

Discusses the expression of chemical analyses, the chemical character of water and the properties of natural waters; gives a classification of waters based on property values and reacting values, and discusses the character of the waters of certain rivers as interpreted directly from the results of analyses; discusses also the relation of water properties to geologic formations, silica in river water, and the character of the water of the Mississippi and the Great Lakes and St. Lawrence River as indicated by chemical analyses.

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[1] Many of the reports contain brief subject bibliographies. See abstracts.

[2] Many analyses of river, spring, and well waters are scattered through publications, as noted in abstracts.

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UNITED STATES GEOLOGICAL SURVEY
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Water-Supply. Paper 413

SURFACE WATER SUPPLY OF THE UNITED STATES

1915

PART XII. NORTH PACIFIC DRAINAGE BASINS

B. SNAKE RIVER BASIN

NATHAN C. GROVER, Chief Hydraulic Engineer
G. C. BALDWIN and F. F. HENSHAW, District Engineers

Prepared in cooperation with
THE STATES OF IDAHO, OREGON, NEVADA, AND WASHINGTON

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SURFACE WATER SUPPLY OF SNAKE RIVER BASIN, 1915.

AUTHORIZATION AND SCOPE OF WORK.

This volume is one of a series of 14 reports presenting results of measurements of flow made on streams in the United States during the year ending September 30, 1915.

The data presented in these reports were collected by the United States Geological Survey under authority implied in the organic law (20 Stat. L., p. 394), which contains the following paragraph:

> *Provided*, That this officer [the Director] shall have the direction of the Geological Survey and the classification of public lands and examination of the geological structure, mineral resources, and products of the national domain.

The work was begun in 1888 in connection with special studies of water supply for irrigation. Since the fiscal year ending June 30, 1895, successive sundry civil bills passed by Congress have carried the following item and appropriations:

> For gaging the streams and determining the water supply of the United States, and for the investigation of underground currents and artesian wells, and for the preparation of reports upon the best methods of utilizing the water resources.

Annual appropriations for the fiscal years ending June 30, 1895–1916.

1895	$12,500
1896	20,000
1897 to 1900, inclusive	50,000
1901 to 1902, inclusive	100,000
1903 to 1906, inclusive	200,000
1907	150,000
1908 to 1910, inclusive	100,000
1911 to 1916, inclusive	150,000

In the execution of the work many private and State organizations have cooperated, either by furnishing data or by assisting in collecting data. Acknowledgments for cooperation of the first kind are made in connection with the description of each station affected; cooperation of the second kind is acknowledged on page 13.

Measurements of stream flow have been made at about 3,800 points in the United States and also at many points in Alaska and the Hawaiian Islands. In July, 1915, 1,350 gaging stations were being maintained by the Survey and the cooperating organizations. Many miscellaneous discharge measurements were made at other points.

In connection with this work data were also collected in regard to precipitation, evaporation, storage reservoirs, river profiles, and water power in many sections of the country and will be made available in the regular water-supply papers from time to time Information in regard to publications relating to water resources is presented in the appendix to this report.

DEFINITION OF TERMS.

The volume of water flowing in a stream—the "run-off" or "discharge"—is expressed in various terms, each of which has become associated with a certain class of work. These terms may be divided into two groups—(1) those that represent a rate of flow, as second-feet, gallons per minute, miner's inches, and discharge in second-feet per square mile, and (2) those that represent the actual quantity of water, as run-off in depth in inches, acre-feet, and millions of cubic feet. The principal terms used in this series of reports are second-feet, second-feet per square mile, run-off in inches, and acre-feet. They may be defined as follows:

"Second-feet" is an abbreviation for "cubic feet per second." A second-foot is the rate of discharge of water flowing in a channel of rectangular cross-section 1 foot wide and 1 foot deep at an average velocity of 1 foot per second. It is generally used as a fundamental unit from which others are computed by the use of the factors given in the tables of convenient equivalents (pp. 9–10).

"Second-feet per square mile" is the average number of cubic feet of water flowing per second from each square mile of area drained, on the assumption that the run-off is distributed uniformly both as regards time and area.

"Run-off depth in inches" is the depth to which an area would be covered if all the water flowing from it in a given period were uniformly distributed on the surface. It is used for comparing run-off with rainfall, which is usually expressed in depth of inches.

An "acre-foot," equivalent to 43,560 cubic feet, is the quantity required to cover an acre to the depth of 1 foot. The term is commonly used in connection with storage for irrigation.

The following terms not in common use are here defined:

"Stage-discharge relation," an abbreviation for the expression "relation of gage height to discharge."

"Control," a term used to designate the section or sections of the stream below the gage which determine the stage-discharge relation at the gage. It should be noted that the control may not be the same section or sections at all stages.

The "point of zero flow" for a gaging station is that point on the gage—the gage height—to which the surface of the river would fall if there were no flow.

CONVENIENT EQUIVALENTS.

The following is a list of convenient equivalents for use in hydraulic computations:

Table for converting discharge in second-feet per square mile into run-off in depth in inches over the area.

Discharge (second-feet per square mile).	Run-off (depth in inches).				
	1 day.	28 days.	29 days.	30 days.	31 days.
1	0.03719	1.041	1.079	1.116	1.153
2	.07438	2.083	2.157	2.231	2.306
3	.11157	3.124	3.236	3.347	3.459
4	.14876	4.165	4.314	4.463	4.612
5	.18595	5.207	5.393	5.578	5.764
6	.22314	6.248	6.471	6.694	6.917
7	.26033	7.289	7.550	7.810	8.070
8	.29752	8.331	8.628	8.926	9.223
9	.33471	9.372	9.707	10.041	10.376

NOTE.—For part of month multiply run-off for 1 day by the number of days.

Table for converting discharge in second-feet into run-off in acre-feet.

Discharge (second-feet).	Run-off (acre-feet).				
	1 day.	28 days.	29 days.	30 days.	31 days.
1	1.983	55.54	57.52	59.50	61.49
2	3.967	111.1	115.0	119.0	123.0
3	5.950	166.6	172.6	178.5	184.5
4	7.934	222.1	230.1	238.0	246.0
5	9.917	277.7	287.6	297.5	307.4
6	11.90	333.2	345.1	357.0	368.9
7	13.88	388.8	402.6	416.5	430.4
8	15.87	444.3	460.2	476.0	491.9
9	17.85	499.8	517.7	535.5	553.4

NOTE.—For part of a month multiply the run-off for 1 day by the number of days.

Table for converting discharge in second-feet into run-off in millions of cubic feet.

Discharge (second-feet).	Run-off (millions of cubic feet).				
	1 day.	28 days.	29 days.	30 days.	31 days.
1	0.0864	2.419	2.506	2.592	2.678
2	.1728	4.838	5.012	5.184	5.356
3	.2592	7.257	7.518	7.776	8.034
4	.3456	9.676	10.02	10.37	10.71
5	.4320	12.10	12.53	12.96	13.39
6	.5184	14.51	15.04	15.55	16.07
7	.6048	16.93	17.54	18.14	18.75
8	6912	19.35	20.05	20.74	21.42
9	7776	21.77	22.55	23.33	24.10

NOTE.—For part of a month multiply the run-off for 1 day by the number of days.

Table for converting discharge in second-feet into run-off in millions of gallons.

Discharge (second-feet).	Run-off (millions of gallons).				
	1 day.	28 days.	29 days.	30 days.	31 days.
1	0.6463	18.10	18.74	19.39	20.04
2	1.293	36.20	37.48	38.78	40.08
3	1.939	54.30	56.22	58.17	60.12
4	2.585	72.40	74.96	77.56	80.16
5	3.232	90.50	93.70	96.95	100.2
6	3.878	108.6	112.4	116.3	120.2
7	4.524	126.7	131.2	135.7	140.3
8	5.171	144.8	149.9	155.1	160.3
9	5.817	162.9	168.7	174.5	180.4

NOTE.—For part of a month multiply the run-off for 1 day by the number of days.

Table for converting velocity in feet per second into velocity in miles per hour.

[1 foot per second=0.681818 mile per hour, or two-thirds mile per hour, very nearly: 1 mile per hour=1.4666 feet per second. In computing the table the values 0.68182 and 1.4667 were used.]

Feet per second (units).	Miles per hour for tenths of foot per second.									
	0	1	2	3	4	5	6	7	8	9
0	0.000	0.068	0.136	0.205	0.273	0.341	0.409	0.477	0.545	0.614
1	.682	.750	.818	.886	.995	1.02	1.09	1.16	1.23	1.30
2	1.36	1.43	1.50	1.57	1.64	1.70	1.77	1.84	1.91	1.98
3	2.05	2.11	2.18	2.25	2.32	2.39	2.45	2.52	2.59	2.66
4	2.73	2.80	2.86	2.93	3.00	3.07	3.14	3.20	3.27	3.34
5	3.41	3.48	3.55	3.61	3.68	3.75	3.82	3.89	3.95	4.02
6	4.09	4.16	4.23	4.30	4.36	4.43	4.50	4.57	4.64	4.70
7	4.77	4.84	4.91	4.98	5.05	5.11	5.18	5.25	5.32	5.39
8	5.45	5.52	5.59	5.66	5.73	5.80	5.86	5.93	6.00	6.07
9	6.14	6.20	6.27	6.34	6.41	6.48	6.55	6.61	6.68	6.75

1 second-foot equals 40 California miner's inches (law of Mar. 23, 1901).

1 second-foot equals 38.4 Colorado miner's inches.

1 second-foot equals 40 Arizona miner's inches.

1 second-foot equals 7.48 United States gallons per second; equals 448.8 gallons per minute; equals 646,317 gallons for one day.

1 second-foot for one year (365 days) covers 1 square mile 1.131 feet, or 13.572 inches deep.

1 second-foot for one year (365 days) equals 31,536,000 cubic feet.

1 second-foot equals about 1 acre-inch per hour.

1 second-foot for one year (365 days) equals 724 acre-feet.

1 second-foot for one day equals 86,400 cubic feet.

1,000,000,000 (1 United States billion) cubic feet equals 11,570 second-feet for one day.

1,000,000,000 cubic feet equals 414 second-feet for one 28-day month.

1,000,000,000 cubic feet equals 399 second-feet for one 29-day month.

1,000,000,000 cubic feet equals 386 second-feet for one 30-day month.

1,000,000,000 cubic feet equals 373 second-feet for one 31-day month.

100 California miner's inches equals 18.7 United States gallons per second.

100 California miner's inches for one day equals 4.96 acre-feet.

100 Colorado miner's inches equals 2.60 second-feet.

100 Colorado miner's inches equals 19.5 United States gallons per second.

100 Colorado miner's inches for one day equals 5.17 acre-feet.

100 United States gallons per minute equals 0.223 second-foot.

100 United States gallons per minute for one day equals 0.442 acre-foot.

1,000,000 United States gallons per day equals 1.55 second-feet.
1,000,000 United States gallons equals 3.07 acre-feet.
1,000,000 cubic feet equals 22.95 acre-feet.
1 acre-foot equals 325,850 gallons.
1 inch deep on 1 square mile equals 2,323,200 cubic feet.
1 inch deep on 1 square mile equals 0.0737 second-foot per year.
1 foot equals 0.3048 meter.
1 mile equals 1.60935 kilometers.
1 mile equals 5,280 feet.
1 acre equals 0.4047 hectáre.
1 acre equals 43,560 square feet.
1 acre equals 209 feet square, nearly.
1 square mile equals 2.59 square kilometers.
1 cubic foot equals 0.0283 cubic meter.
1 cubic foot of water weighs 62.5 pounds.
1 cubic meter per minute equals 0.5886 second-foot.
1 horsepower equals 550 foot-pounds per second.
1 horsepower equals 76.0 kilogram-meters per second.
1 horsepower equals 746 watts.
1 horsepower equals 1 second-foot falling 8.80 feet.
1⅓ horsepower equals about 1 kilowatt.

To calculate water power quickly: $\frac{\text{Second-feet} \times \text{fall in feet}}{11}$ = net horsepower on water wheel realizing 80 per cent of theoretical power.

EXPLANATION OF DATA.

The data presented in this report cover the year beginning October 1, 1914, and ending September 30, 1915. At the 1st of January in most parts of the United States much of the precipitation in the preceding three months is stored as ground water, in the form of snow or ice, or in ponds, lakes, and swamps, and this stored water passes off in the streams during the spring break-up; at the end of September, on the other hand, the only stored water available for run-off is possibly a small quantity in the ground; therefore the run-off for the year beginning October 1 is practically all derived from precipitation within that year.

The base data collected at gaging stations consist of records of stage, measurements of discharge, and general information used to supplement the gage heights and discharge measurements in determining the daily flow. The records of stage are obtained either from direct readings on a staff or chain gage or from a water-stage recorder that gives a continuous record of the fluctuations. Measurements of discharge are made with a current meter by the general methods outlined in standard textbooks on the measurement of river discharge. (See Pls. I and II.)

From the discharge measurements rating tables are prepared that give the discharge for any stage, and these rating tables, when applied to the gage heights, give the daily discharge from which the monthly and yearly mean discharge is determined.

The data presented for each gaging station in the area covered by this report comprise a description of the station, a table giving results of discharge measurements, a table showing the daily discharge of the stream, and a table of monthly and yearly discharge and run-off.

If the base data are insufficient to determine the daily discharge, tables giving daily gage heights and results of discharge measurements are published.

The description of the station gives, in addition to statements regarding location and equipment, information in regard to any conditions that may affect the constancy of the stage-discharge relation, covering such subjects as the occurrence of ice, the use of the stream for log driving, shifting of channel, and the cause and effect of backwater; it gives also information as to diversions that decrease the flow at the gage, artificial regulation, maximum and minimum recorded stages, and the accuracy of the records.

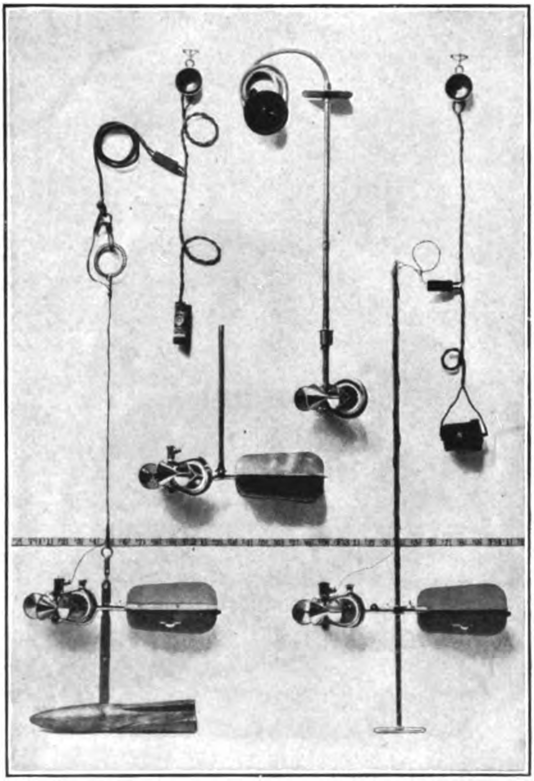
The table of daily discharge gives the discharge in second-feet corresponding to the mean of the gage heights read each day. At stations on streams subject to sudden or rapid diurnal fluctuation the discharge obtained from the rating table and the mean daily gage height may not be the true mean discharge for the day. When such stations are equipped with water-stage recorders, the true mean daily discharge may be obtained by computing the mean daily gage height and applying it to the rating table, by averaging quantities of discharge for regular intervals during the day, or by means of a discharge integrator, an instrument operating on the principle of the planimeter and containing as an essential element the rating curve of the station.

In the table of monthly discharge the column headed "Maximum" gives the mean flow for the day when the mean gage height was highest. As the gage height is the mean for the day it does not indicate correctly the stage when the water surface was at crest height and the corresponding discharge was consequently larger than that given in the maximum column. Likewise, in the column headed "Minimum," the quantity given is the mean flow for the day when the mean gage height was lowest. The column headed "Mean" is the average flow in cubic feet for each second during the month. On this average flow computations recorded in the remaining columns, which are defined on page 8, are based.

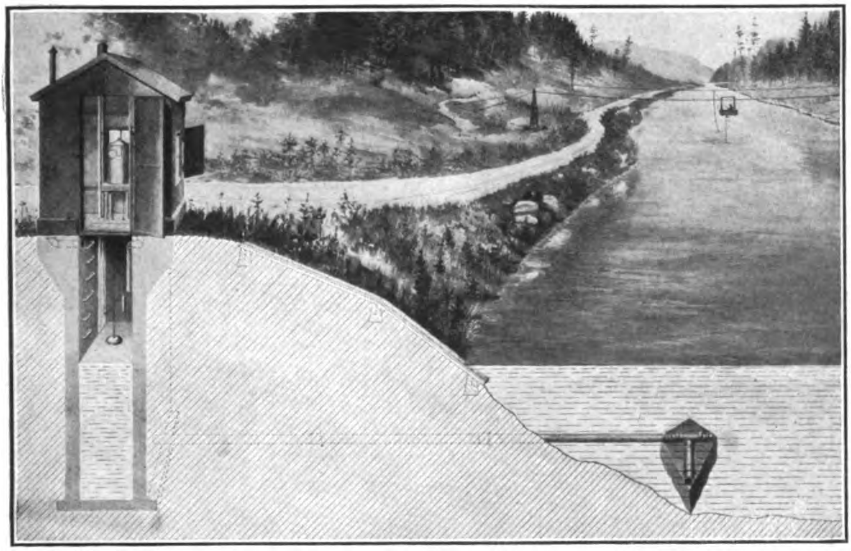
ACCURACY OF FIELD DATA AND COMPUTED RESULTS.

The accuracy of steam-flow data depends primarily (1) on the permanance of the stage-discharge relation and (2) on the accuracy of observations of stage, measurements of flow, and interpretation of records.

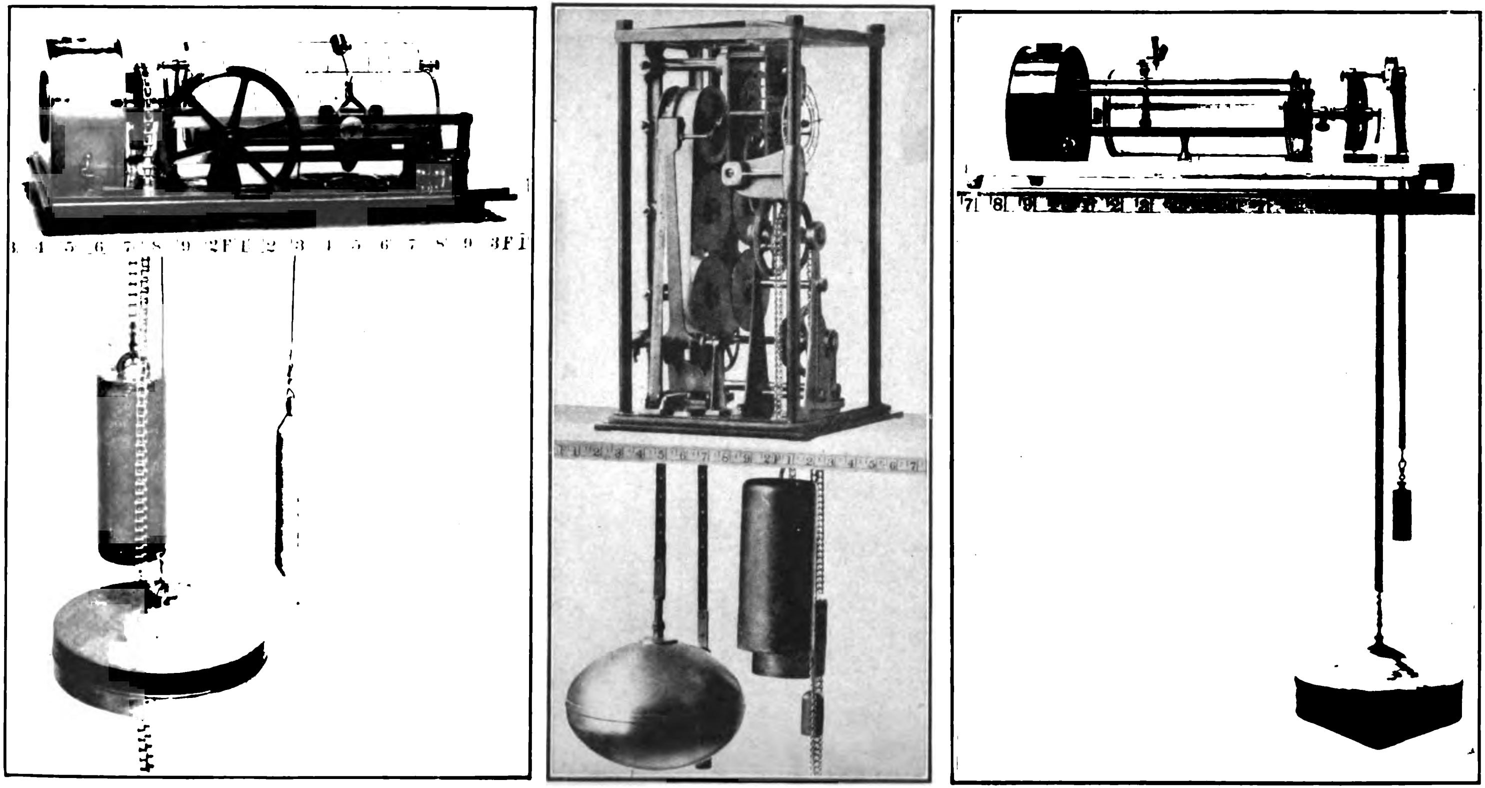
Foot-notes added to the daily-discharge tables give information regarding the probable accuracy of the rating tables used, and an



A. PRICE CURRENT METERS.



B. TYPICAL GAGING STATION.



A. STEVENS.

B. GURLEY PRINTING.

C. FRIEZ.

WATER-STAGE RECORDERS.

accuracy column is inserted in the monthly-discharge table. For the rating tables, "well defined" indicates, in general, that the rating is probably accurate within 5 per cent; "fairly well defined," within 10 per cent; "poorly defined," within 15 to 25 per cent. These notes are very general and are based on the plotting of the individual measurements with reference to the mean rating curve.

The letter in the column headed "Accuracy," in the monthly-discharge table, rates the accuracy of the monthly mean and not that of the estimate of maximum or minimum discharge or the discharge for any one day. The rating is determined by considering the accuracy of the rating curve, the probable reliability of the observer, the number of gage readings per day, the range of the fluctuation in stage, and local conditions. In this column A indicates that determination of the mean monthly flow is probably accurate within 5 per cent; B, within 10 per cent; C, within 15 per cent; D, within 25 per cent. Special conditions are covered by footnotes.

The monthly means for any station may represent with high accuracy the quantity of water flowing past the gage, but the figures showing discharge per square mile and depth of run-off in inches may be subject to gross errors caused by the inclusion of large noncontributing districts in the measured drainage area, by lack of information concerning water diverted for irrigation or other use, or by inability to interpret the effect of artificial regulation of the flow of the river above the station. "Second-feet per square mile" and "run-off (depth in inches)" are therefore not computed if such errors appear probable. The computations are also omitted for stations on streams draining areas in which the annual rainfall is less than 20 inches. All figures representing "second-feet per square mile" and "run-off (depth in inches)" previously published by the Survey should be used with caution because of possible inherent sources of error not known to the Survey.

The table of monthly discharge gives only a general idea of the flow at the station and should not be used for other than preliminary estimates; the tables of daily discharge allow more detailed studies of the variation in flow. It should be borne in mind, however, that the observations in each succeeding year may be expected to throw new light on data previously published.

COOPERATION.

During the year ending September 30, 1915, work in the Snake River basin was carried on in cooperation with the States of Idaho, Oregon, Nevada, and Washington, effected under contracts made between the Director of the Federal Survey and the State engineers or other officials and authorized by legislative acts appropriating money. The State of Idaho, however, furnished no funds for the cooperative work after November 30, 1914.

Special acknowledgements are due to Frank P. King, State engineer of Idaho, and Herbert Wing, acting State engineer, after the death of Mr. King; to John H. Lewis, State engineer of Oregon; to Henry Landes, State geologist of Washington; and to W. M. Kearney, State engineer of Nevada, for the efficient manner in which they represented their States in the investigations.

Acknowledgements are due also to the United States Reclamation Service, the United States Forest Service, and the United States Indian Office, which permitted the freest use of data gathered exclusively for them and paid for by them. The United States Weather Bureau and the officials of Yellowstone National Park furnished hydrometric and climatic data.

The following cities, private companies, and individuals have aided in the collection of records by paying the expense of work or otherwise assisting: City of Pocatello, Twin Falls Canal Co., I. B. Perrine, Idaho Power Co., Twin Falls-Oakley Land & Water Co., Twin Falls-Salmon River Land & Water Co., North Side Twin Falls Land & Water Co., Idaho Irrigation Co., L. S. Kimball, Willow River Land & Irrigation Co., Mesa Orchards Co., Crane Creek Irrigation, Land & Power Co., Maney Bros. Construction Co., Utah Construction Co., Portneuf-Marsh Valley Canal Co., S. A. Mullenix, J. J. Richardson, P. W. McCarthy, and Burbank Co.

DIVISION OF WORK.

The data for stations in Nevada, except those in the basin of Salmon Falls Creek, were collected and prepared for publication under the direction of E. A. Porter and C. C. Jacob, district engineers, who were assisted by Lynn Crandall, A. B. Burton, L. W. Jordan, J. J. Sanford, C. W. Bennett, and Miss Ruby Christenson.

For stations in Idaho, except the Clearwater basin, in Wyoming and in the Salmon Falls Creek basin in Nevada, the data were collected and prepared for publication under the direction of G. C. Baldwin, district engineer, assisted by A. B. Purton, H. J. Dean, A. W. Harrington, C. G. Paulsen, L. W. Roush, and Miss E. Hazel Haugse.

Data for stations in Oregon were collected and prepared for publication under the direction of F. F. Henshaw, district engineer, who was assisted by James E. Stewart, C. L. Batchelder, C. G. Paulsen, P. V. Hodges, and C. E. Stricklin and H. K. Donnelly, assistants to the State engineer of Oregon.

For stations in Washington and in the Clearwater basin in Idaho records were collected and prepared for publication by G. L. Parker, district engineer, who was assisted by James E. Stewart, Lasley Lee, C. O. Brown, J. T. Hartson, A. H. Tuttle, C. G. Paulsen, and I. L. Collier.

The manuscript was assembled by H. J. Dean and G. C. Stevens.

GAGING-STATION RECORDS.

SNAKE RIVER.

SNAKE RIVER AT SOUTH BOUNDARY OF YELLOWSTONE NATIONAL PARK.

Location.—About one-fourth mile below junction of Lewis and Snake rivers, half a mile north of the Snake River soldier station and the south boundary of Yellowstone National Park, and 25 miles north of Moran, Wyo.

Drainage area.—490 square miles (measured on topographic maps).

Records available.—June 19, 1913, to September 30, 1915.

Gage.—Overhanging chain gage on right bank; read by Sergt. James M. Webb. in charge of Snake River soldier station.

Discharge measurements.—Made by wading or from highway bridge about 4 miles downstream.

Channel and control.—Bed composed of coarse gravel; clean except for drift which occasionally lodges on control. Control probably permanent at ordinary stages One channel at gage but an island divides channel at control.

Extremes of discharge.—Maximum stage recorded during year, 4.9 feet at 6 p. m. June 6 (discharge, 3,230 second-feet); minimum stage recorded, 1.7 feet March 2–8, August 28–31, and September 7 (discharge, 271 second-feet).

1913–1915: Maximum stage recorded 6.3 feet June 2, 1914 (discharge, 5,690 second-feet); minimum stage recorded, 1.7 feet March 2–8, August 28–31, and September 7, 1915 (discharge, 271 second-feet).

Winter flow.—Stage-discharge relation not affected by ice, the formation of which is evidently prevented by hot springs above the gage.

Diversions.—None above station.

Regulation.—None.

Accuracy.—Stage-discharge relation permanent. Gage read to half tenths twice daily. Gage-height record fairly satisfactory. Rating curve well defined between 250 and 5,000 second-feet by measurements made in 1916 and 1917. Discharge ascertained by applying mean daily gage heights to rating table. Records published herewith supersede those previously published and are rated good.

Cooperation.—Gage-height record furnished by superintendent of Yellowstone National Park.

The following discharge measurement was made by A. W. Harrington:

September 13, 1915: Gage height, 1.80 feet; discharge, 304 second-feet.

Daily discharge, in second-feet, of Snake River at south boundary of Yellowstone National Park for the years ending Sept. 30, 1913–1915.

Day.	June.	July.	Aug.	Sept.	Day.	June.	July.	Aug.	Sept.
1913.					1913.				
1	....	2,750	1,480	821	16	....	1,110	887	587
2	....	2,600	1,280	758	17	....	956	821	587
3	....	2,450	1,280	758	18	....	956	821	561
4	....	2,450	1,280	758	19	3,070	956	758	561
5	....	2,180	1,280	758	20	3,230	922	758	561
6	....	2,050	1,200	698	21	3,070	887	698	561
7	....	1,930	1,110	641	22	2,750	1,480	698	587
8	....	1,930	1,030	587	23	2,750	1,110	698	561
9	....	1,700	1,110	698	24	2,750	1,810	670	561
10	....	1,700	1,110	641	25	2,750	2,050	670	535
11	....	1,480	1,030	614	26	2,450	2,450	670	535
12	....	1,380	956	614	27	2,750	2,180	728	535
13	....	1,280	956	587	28	2,750	1,810	698	510
14	....	1,200	956	587	29	2,750	2,050	641	510
15	....	1,110	887	587	30	2,750	1,700	641	510
					31	....	1,590	821	....

Daily discharge, in second-feet of Snake River at south boundary of Yellowstone National Park for the years ending Sept. 30, 1913–1915—Continued.

Day.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.
1913–14.											
1	510	510	486	416	561	535	351	821	5,510	2,050	641
2	510	561	486	416	587	486	351	922	5,690	1,930	....
3	510	535	486	416	535	486	351	1,280	5,510	1,810	....
4	510	510	462	416	510	462	351	1,280	5,510	1,700	....
5	510	486	462	416	510	462	351	1,150	5,510	1,700	....
6	510	587	439	416	510	439	351	1,070	4,430	1,590	....
7	510	587	439	416	510	439	372	1,110	3,400	1,480	....
8	510	535	439	416	486	416	372	1,700	3,400	1,380	....
9	510	510	439	416	486	394	394	2,180	3,400	1,280	....
10	510	510	439	416	486	372	394	2,600	3,400	1,280	....
11	510	535	416	416	486	372	394	2,180	3,400	1,280	....
12	510	510	416	394	510	372	416	1,930	3,230	1,200	....
13	535	510	394	394	510	372	416	2,180	3,400	1,110	....
14	535	486	416	394	535	351	439	2,750	3,400	1,110	....
15	535	462	416	416	535	351	439	2,750	3,740	1,030	....
16	535	462	416	416	561	351	486	3,070	3,910	956	....
17	561	462	416	394	561	351	462	3,400	4,080	922	....
18	561	486	416	394	561	351	486	3,740	4,430	887	....
19	535	486	416	394	561	351	486	3,740	3,570	854	....
20	535	510	416	416	535	330	698	3,910	3,740	821	....
21	535	510	416	439	535	330	728	4,430	4,080	821	....
22	535	535	416	439	510	330	790	4,970	3,400	790	....
23	535	510	416	486	486	330	854	4,970	2,910	758	....
24	510	486	416	486	561	330	790	5,330	2,750	728	....
25	510	510	416	486	535	330	821	4,790	2,600	670	....
26	510	535	416	535	561	330	821	4,080	2,600	641	....
27	510	535	416	561	561	330	790	4,250	2,600	614	....
28	510	561	416	587	561	351	758	4,430	2,450	587	....
29	510	535	394	587	....	351	698	4,430	2,310	641	....
30	510	510	416	535	....	351	670	4,790	2,310	698	....
31	510	....	416	510	....	351	....	5,150	....	670	....

Day.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.
1914–15.												
1	....	439	330	351	439	310	535	1,810	1,930	1,030	486	290
2	....	439	310	351	439	271	641	1,930	2,180	956	462	330
3	....	439	310	351	416	271	854	2,060	2,450	854	439	330
4	1,280	439	310	394	394	271	956	2,180	2,600	821	462	372
5	1,280	416	310	394	394	271	1,110	2,180	2,750	790	439	351
6	1,200	394	330	394	394	271	1,280	2,450	3,070	758	439	310
7	1,110	394	394	439	394	271	1,480	2,180	2,450	728	416	271
8	1,110	394	439	439	394	271	1,590	2,180	2,310	698	394	290
9	1,110	394	439	439	372	290	1,700	2,180	1,930	641	351	310
10	1,030	394	486	439	351	351	1,700	2,310	2,180	614	351	310
11	1,030	394	486	439	351	351	1,700	2,180	1,930	641	351	310
12	956	394	486	439	351	351	1,590	2,180	1,810	641	310	310
13	887	351	486	439	351	351	1,480	2,450	1,700	587	310	310
14	887	351	561	439	351	351	1,590	2,450	1,810	561	310	310
15	854	351	587	439	351	351	1,480	2,180	1,930	535	330	310
16	821	351	561	439	351	351	1,280	1,930	2,180	510	330	310
17	821	351	535	439	351	351	1,110	1,810	2,450	486	330	330
18	790	351	510	462	351	394	1,280	1,700	2,450	486	310	351
19	758	351	486	486	351	394	1,590	1,480	2,450	510	310	351
20	728	351	462	486	330	394	1,700	1,380	2,180	561	310	351
21	698	310	439	486	310	394	1,810	1,480	2,180	587	310	394
22	670	330	439	486	310	351	1,930	1,480	2,180	535	310	394
23	641	394	439	486	310	351	2,180	1,480	1,810	535	290	439
24	614	394	416	486	310	351	2,310	1,590	1,700	510	290	439
25	587	372	394	439	310	351	2,180	1,480	1,700	486	290	486
26	561	351	394	439	310	351	1,930	1,700	1,700	587	310	462
27	535	351	394	439	310	372	2,180	1,590	1,700	561	290	439
28	535	351	351	439	310	394	2,060	1,480	1,380	535	271	439
29	535	351	351	439	....	439	1,930	1,590	1,280	535	271	486
30	486	351	351	439	....	439	1,700	1,590	1,030	486	271	462
31	439	....	351	439	....	462	....	1,700	....	486	271	....

NOTE.—No record obtained Aug. 2 to Oct. 4, 1914; discharge Oct. 1–3, 1914, estimated at 1,230 second-feet.

Monthly discharge of Snake River at south boundary of Yellowstone National Park for the years ending Sept. 30, 1913–1915.

[Drainage area, 490 square miles.]

Month.	Discharge in second-feet.				Run-off.		Accuracy.
	Maximum.	Minimum.	Mean.	Per square mile.	Depth in inches on drainage area.	Total in acre-feet.	
1913.							
June 19–30	3,230	2,450	2,820	5.76	2.57	67,100	A.
July	2,750	887	1,680	3.43	3.95	103,000	A.
August	1,480	641	923	1.88	2.17	56,800	A.
September	821	510	612	1.25	1.40	36,400	A.
The period						263,000	
1913–14.							
October	561	510	521	1.06	1.22	32,000	A.
November	587	462	516	1.05	1.17	30,700	A.
December	486	394	428	.873	1.01	26,300	A.
January	587	394	446	.910	1.05	27,400	A.
February	587	486	530	1.08	1.12	29,400	A.
March	535	330	379	.773	.89	23,300	A.
April	854	351	536	1.09	1.22	31,900	A.
May	5,330	821	3,080	6.29	7.25	189,000	B.
June	5,690	2,310	3,690	7.53	8.40	220,000	B.
July	2,050	587	1,100	2.24	2.58	67,600	B.
The period						678,000	
1914–15.							
October		439	859	1.75	2.02	52,800	B.
November	439	310	376	.767	.86	22,400	B.
December	587	310	424	.865	1.00	26,100	B.
January	486	351	436	.890	1.03	26,800	B.
February	439	310	356	.727	.76	19,800	B.
March	462	271	347	.708	.82	21,300	B.
April	2,310	535	1,560	3.18	3.55	92,800	B.
May	2,450	1,380	1,880	3.84	4.43	116,000	B.
June	3,070	1,030	2,050	4.18	4.66	122,000	B.
July	1,030	486	621	1.27	1.46	38,200	B.
August	486	271	342	.698	.80	21,000	B.
September	486	271	362	.739	.82	21,500	B.
The year	3,070	271	802	1.64	22.21	581,000	

JACKSON LAKE AT MORAN, WYO.

Location.—In sec. 18, T. 45 N., R. 114 W., a short distance above gates at outlet of lake at Moran, Lincoln County.

Records available.—June 1, 1909, to September 30, 1915. Records for years 1909 and 1910 fragmentary.

Gage.—Inclined staff on right shore just below the engineers' cottage; zero of gage 700 feet above sea level.

Cooperation.—Gage-height record furnished by United States Reclamation Service.

Daily gage height, in feet, of Jackson Lake at Moran, Wyo., for the year ending Sept. 30, 1915.

Day.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.
1	......	......	39.30	38.80	38.60	39.45	40.80	45.45	51.80	49.65	41.76	33.90
2	......	......	39.28	38.80	38.60	39.50	40.85	45.67	52.30	49.10	41.43	33.84
3	......	......	39.25	38.80	38.60	39.55	40.90	45.80	52.50	48.60	41.13	33.86
4	......	......	39.20	38.75	38.60	39.60	41.05	46.00	52.75	48.00	40.69	33.88
5	......	......	39.20	38.75	38.60	39.65	41.10	46.05	52.85	47.40	40.05	33.85
6	......	......	39.20	38.75	38.60	39.70	41.65	46.18	52.90	46.90	39.40	33.82
7	......	......	39.20	38.75	38.60	39.75	41.70	46.40	52.90	46.30	38.80	33.77
8	......	......	39.15	38.70	38.60	39.80	41.75	46.40	53.10	45.75	38.15	33.71
9	......	......	39.10	38.70	38.60	39.85	41.80	46.50	53.35	45.25	37.62	33.66
10	......	......	39.10	38.70	38.65	39.85	41.85	46.75	53.70	45.00	37.04	33.62
11	37.90	......	39.10	38.65	38.70	39.90	41.94	46.85	53.90	44.95	36.67	33.59
12	38.10	......	39.05	38.65	38.75	39.95	42.00	47.05	54.00	44.85	36.30	33.54
13	38.20	......	39.05	38.65	38.80	40.00	42.05	47.30	53.95	44.75	36.23	33.50
14	38.30	......	39.00	38.65	38.80	40.05	42.15	47.60	53.95	44.65	36.15	33.44
15	38.40	39.55	39.00	38.60	38.85	40.05	42.28	47.90	53.95	44.60	35.91	33.40
16	38.50	39.50	39.00	38.60	38.90	40.10	42.43	48.00	53.90	44.55	35.65	33.38
17	38.60	39.50	39.00	38.60	38.95	40.15	42.58	48.20	53.90	44.50	35.45	33.35
18	......	39.48	39.00	38.55	39.05	40.20	42.73	48.45	54.00	44.45	35.34	33.32
19	......	39.48	39.00	38.50	39.00	40.25	42.94	48.70	54.00	44.10	35.10	33.30
20	......	39.48	39.00	38.50	39.05	40.30	43.12	49.00	54.00	43.90	34.95	33.27
21	......	39.45	38.95	38.50	39.10	40.35	43.48	49.15	54.00	43.65	34.80	33.25
22	......	39.45	38.95	38.50	39.20	40.40	43.60	49.35	53.90	43.45	34.70	33.23
23	......	39.43	38.95	38.45	39.25	40.45	43.80	49.65	53.85	43.20	34.60	33.20
24	......	39.42	38.90	38.45	39.30	40.50	43.98	49.80	53.80	42.95	34.50	33.19
25	......	39.40	38.90	38.45	39.30	40.55	44.15	50.00	53.40	42.70	34.45	33.22
26	......	39.35	38.90	38.45	39.35	40.60	44.33	50.20	53.00	42.55	34.33	33.24
27	......	39.30	38.85	38.50	39.40	40.60	44.65	50.45	52.50	42.58	34.22	33.34
28	......	39.30	38.85	38.50	39.40	40.65	44.67	50.70	51.60	42.59	34.18	33.44
29	......	39.30	38.85	38.55	......	40.70	44.95	50.90	50.95	42.54	34.10	33.40
30	......	39.30	38.85	38.60	......	40.70	45.20	51.00	50.30	42.30	34.02	33.38
31	......	......	38.85	38.60	......	40.70	......	51.20	......	42.09	33.95	......

NOTE.—Add 6,700 feet to reduced these gage heights to sea-level datum.

SNAKE RIVER NEAR MORAN, WYO.

LOCATION.—In sec. 17, T. 45 N., R. 114 W., about 1½ miles below Moran post office, Lincoln county, and United States Reclamation Service dam at outlet of Jackson Lake. No important tributaries between dam and statiom.

DRAINAGE AREA.—820 square miles.

RECORDS AVAILABLE.—September 21, 1903, to Spetember 30, 1915.

GAGE.—Inclined staff on left bank; datum lowered 1.0 foot on July 26, 1915. Read by employees of United States Reclamation Service.

DISCHARGE MEASUREMENTS.—Made from cable about 100 feet below gage or by wading.

CHANNEL AND CONTROL.—Bed composed of gravel and boulders; control practically permanent.

WINTER FLOW.—Stage-discharge relation not affected by ice during year.

EXTREMES OF DISCHARGE.—Maximum stage recorded during year, 7.75 feet at 2 p. m., June 27 (discharge 9,610 second-feet); minimum stage recorded −0.50 foot on different days during October, January, February, and March (discharge 28 second-feet.

1903–1915: Maximum stage recorded 8.8 feet July 6, 1910 (discharge 12,100 second-feet); (no flow during a few days in 1907 and 1909, when gates in Jackson Lake dam were closed).

DIVERSIONS.—No diversions between dam and station and practically none above Jackson Lake.

REGULATION.—Flow controlled by operation of gates in Jackson Lake dam. Storage capacity of reservoir in 1915 about 400,000 acre-feet.

Accuracy.—Stage-discharge relation constant during year. Rating curve well defined between 50 and 8,000 second-feet. Discharge ascertained by applying mean daily gage heights to rating table. Records good except those for low water in February, March, and April, which are somewhat uncertain.

Cooperation.—Gage-height record furnished by United States Reclamation Service.

The following discharge measurement was made by Robert Follansbee:

July 23, 1915: Gage height, 3.93 feet; discharge, 3,210 second-feet.

Daily discharge, in second-feet, of Snake River near Moran, Wyo., for the year ending Sept. 30, 1915.

Day.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.
1	35	840	670	555	28	28	34	114	132	8,300	3,980	912
2	36	840	670	555	28	28	34	118	132	8,120	3,980	875
3	37	840	670	555	28	28	34	120	2,030	7,950	3,830	875
4	38	840	670	555	28	28	34	123	2,030	7,950	3,830	912
5	38	840	670	555	28	28	34	125	2,160	7,780	6,230	875
6	38	840	670	555	28	28	41	127	2,160	7,780	6,230	840
7	38	840	670	555	28	28	41	127	990	7,780	6,060	840
8	38	840	670	555	28	28	41	127	39	7,600	5,900	805
9	38	805	640	555	28	28	41	127	39	7,420	5,740	770
10	38	805	610	555	28	28	41	127	35	3,090	4,920	735
11	38	805	610	555	28	28	46	127	2,280	2,680	4,440	735
12	34	805	610	555	28	28	50	127	3,090	2,810	3,980	702
13	34	770	610	555	28	28	56	127	2,680	2,810	3,680	670
14	34	770	582	555	28	28	61	127	2,680	2,810	3,240	670
15	34	770	582	555	28	28	68	127	2,160	2,280	2,810	640
16	34	770	582	555	28	28	74	127	2,160	2,280	2,540	610
17	34	770	582	555	28	28	82	127	2,160	2,280	2,410	610
18	34	735	582	555	28	28	87	132	2,160	2,280	2,160	610
19	33	735	582	555	28	28	90	132	2,540	3,240	2,030	582
20	32	735	582	555	28	28	94	138	2,810	3,240	1,800	555
21	30	702	1,110	555	28	28	100	138	2,950	3,380	1,680	555
22	29	702	1,110	555	28	28	105	146	3,680	3,240	1,580	528
23	28	702	555	555	28	28	109	146	3,090	3,240	1,380	528
24	28	702	555	555	28	28	114	146	4,760	3,240	1,380	528
25	500	670	555	555	28	28	114	146	7,080	3,090	1,280	528
26	702	670	555	555	28	28	114	146	8,480	2,540	1,200	582
27	805	640	555	109	28	28	114	132	9,520	990	1,200	640
28	840	670	555	28	28	34	114	132	9,350	1,380	1,110	640
29	840	670	555	28	......	34	114	132	9,350	1,380	1,030	640
30	840	670	555	28	......	34	114	149	9,180	3,380	950	610
31	840	......	555	28	......	34	......	132	......	3,980	950	......

Note.—Discharge interpolated Oct. 1-3.

Monthly discharge of Snake River near Moran, Wyo., for the year ending Sept. 30, 1915.

Month.	Discharge in second-feet.			Run-off (total in acre-feet).	Accuracy.
	Maximum.	Minimum.	Mean.		
October	840	28	200	12,300	B.
November	840	640	760	45,200	A.
December	1,110	555	636	39,100	A.
January	555	28	473	29,100	B.
February	28	28	28.0	1,560	D.
March	34	28	28.8	1,770	D.
April	114	34	72.2	4,360	C.
May	149	114	131	8,060	B.
June	9,520	35	3,400	202,000	B.
July	8,300	990	4,200	258,000	A.
August	6,230	950	3,020	186,000	A.
September	912	528	687	40,900	A.
The year	9,520	28	1,150	828,000	

SNAKE RIVER NEAR HEISE, IDAHO.

Location.—In sec. 5, T. 3 N., R. 41 E., about 600 feet above the Anderson dam, Bonneville County, 3 miles above Heise and 25 miles below the station formerly maintained near Lyon. Several small creeks enter between the two stations.

Drainage area.—Not measured.

Records available.—September 25, 1910, to September 30, 1915.

Gage.—Friez water-stage recorder on left bank; installed July 8, 1913, and referred to vertical staff gage. Observer, Parley Byington.

Discharge measurements.—Made from cable about 100 feet below gage.

Channel and control.—Bed composed of coarse gravel and cobbles; two channels at low and medium stages. Control formed by crest of Anderson dam, which is a fairly permanent crib and rock structure. Stage-discharge relation affected at times by repair work on dam and injury to crest caused by ice and high water.

Winter flow.—Stage-discharge relation seriously affected by ice; observations discontinued during winter.

Extremes of discharge.—Maximum stage recorded during year, from water-stage recorder, 6.15 feet at 4 a. m. June 28 (discharge, 17,100 second-feet); minimum stage recorded, 1.1 feet at 10 a. m. March 10 (discharge, 2,180 second-feet).

1910–1915: Maximum stage recorded, 10.35 feet on June 16 and 17, 1911 (discharge, 36,000 second-feet); minimum stage March 10, 1915.

Diversions.—No large diversions above station. Small ditch of about 20 second-feet capacity diverts just above the station.

Regulation.—Flow is controlled to a large extent by storage in Jackson Lake reservoir.

Accuracy.—Stage-discharge relation practically permanent except when affected by ice. Rating curve well defined between 2,200 and 27,000 second-feet. Water-stage recorder not in operation continuously and one reading a day was obtained on staff gage except December 9 to February 21. Daily discharge ascertained by applying mean daily gage heights to rating table. Records good.

Discharge measurements of Snake River near Heise, Idaho, during the year ending Sept. 30, 1915.

Date.	Made by—	Gage height.	Discharge.	Date.	Made by—	Gage height.	Discharge
		Feet.	*Sec. ft.*			*Feet.*	*Sec.-ft.*
Mar. 19	G. C. Baldwin.......	1.25	2,320	July 8	G. C. Baldwin.......	5.52	15,000
May 30	A. W. Harrington....	4.13	9,340	Sept. 19	A. W. Harrington....	2.06	3,840

Daily discharge, in second-feet, of Snake River near Heise, Idaho, for the year ending Sept. 30, 1915.

Day.	Oct.	Nov.	Dec.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.
1	4,220	4,680	3,600	....	2,300	3,050	8,640	10,300	16,500	7,680	4,010
2	4,220	4,440	3,600	....	2,300	3,220	8,000	12,500	16,100	8,000	4,010
3	4,440	4,440	3,800	....	2,300	3,600	7,060	12,900	16,100	8,000	4,220
4	4,440	4,440	3,600	....	2,300	4,120	6,200	12,500	15,300	7,680	4,680
5	4,560	4,440	3,600	....	2,300	4,120	5,920	12,200	14,900	8,320	4,680
6	4,680	4,440	3,600	....	2,300	3,900	5,790	12,500	14,500	10,300	4,440
7	4,680	4,440	3,600	....	2,300	3,900	5,530	11,800	14,900	9,990	4,220
8	4,680	4,440	3,600	....	2,300	4,010	5,400	11,100	14,500	10,300	4,120
9	4,440	4,220	....	....	2,300	4,010	5,400	9,990	14,500	9,990	4,120
10	4,440	4,220	....	....	2,180	4,010	5,660	10,300	14,500	9,300	4,010
11	4,680	4,220	....	....	2,240	4,120	6,200	9,990	11,800	8,970	4,010
12	4,560	4,220	....	....	2,200	4,340	6,200	9,640	9,640	8,320	4,120
13	4,440	4,220	....	....	2,300	4,560	6,200	10,700	9,990	7,680	4,120
14	4,440	4,220	....	....	2,300	4,910	7,060	10,700	9,990	7,370	4,010
15	4,440	4,010	....	....	2,300	5,530	7,680	9,990	9,300	7,060	3,900
16	4,440	4,010	....	....	2,300	6,200	7,060	9,640	8,640	6,770	3,800
17	4,440	3,800	....	....	2,300	6,480	6,480	9,640	8,000	6,490	3,800
18	4,440	3,800	....	....	2,300	6,480	7,060	10,300	7,680	5,920	3,700
19	4,440	3,800	....	....	2,300	6,770	8,640	10,700	7,370	5,790	3,700
20	4,440	3,600	....	....	2,360	7,370	8,320	10,700	7,680	5,530	3,700
21	4,440	3,600	....	....	2,430	8,000	8,320	10,700	7,680	5,280	3,600
22	4,220	4,010	....	2,300	2,500	8,320	8,970	10,700	8,000	5,030	3,600
23	4,220	4,010	....	2,300	2,570	8,000	8,640	11,400	7.680	4,910	3,600
24	4,010	3,600	....	2,300	2,720	7,370	8,640	11,400	7,680	4,910	3,600
25	4,010	3,600	....	2,300	2,880	6,770	9,300	13,300	7,680	4,910	3,600
26	4,170	3,600	....	2,300	2,800	6,770	9,990	15,700	7,370	4,680	4,340
27	4,340	3,600	....	2,300	2,720	6,770	9,640	16,900	6,770	4,560	5,400
28	4,510	3,600	....	2,300	2,720	7,060	8,970	16,900	5,790	4,440	5,030
29	4,680	3,600	....	....	2,960	7,370	8,970	16,500	5,920	4,220	4,560
30	4,680	3,800	....	....	3,140	8,320	9,300	16,500	5,790	4,220	4,440
31	4,680	....	....	....	2,960	....	9,300	....	6,770	4,010	....

NOTE.—Water stage recorder not in operation Oct. 1 to Mar. 19 and Aug. 29 to Sept. 7; stage observed on staff gage. Discharge interpolated Oct. 5, 12, 16, 19, 26–28, Nov. 26, Dec. 5, Feb. 26, 28, Mar. 11, 14, and 17. Discharge estimated from fragmentary gage-height graph June 23–25, 29 and July 6. No record obtained Dec. 9 to Feb. 21.

Monthly discharge of Snake River near Heise, Idaho, for the year ending Sept. 30, 1915.

Month.	Discharge in second-feet.			Run-off (total in acre-feet).	Accuracy.
	Maximum.	Minimum.	Mean.		
October	4,680	4,010	4,440	273,000	A.
November	4,680	3,600	4,040	240,000	A.
December 1–8	3,800	3,600	3,620	57,500	B.
February 22–28	2,300	2,300	2,300	31,900	A.
March	3,140	2,180	2,460	151,000	A.
April	8,320	3,050	5,650	336,000	A.
May	9,990	5,400	7,570	465,000	A.
June	16,900	9,640	11,900	708,000	A.
July	16,500	5,790	10,300	633,000	A.
August	10,300	4,010	6,790	418,000	A.
September	5,400	3,600	4,100	244,000	A.

NOTE.—See footnote to table of daily discharge.

SNAKE RIVER NEAR SHELLEY, IDAHO.

Location.—In sec. 17, T. 1 N., R. 37 E., about one-fourth mile upstream from the Woodville highway bridge and 3 miles north of Shelley, Bingham County.

Drainage area.—Not measured.

Records available.—March 18, 1915, to September 30, 1915.

Gage.—Friez water-stage recorder on right bank; standard hook gage in float well, and combination vertical and inclined staff gage outside. James Fugal, observer.

Discharge measurements.—Made from the Woodville bridge.

Channel and control.—Control is a lava rock reef extending across the channel about 500 feet below gage. Banks high and clean at the gage and control.

Winter flow.—Stage-discharge relation probably seriously affected by ice.

Extremes of discharge.—Maximum stage during year, from water-stage recorder, 9.6 feet at 9 p. m. June 4 (discharge, 15,400 second-feet); minimum stage from recorder, 4.88 feet at 4 a. m September 2 (discharge, 1,800 second-feet).

Diversions.—Numerous diversions in the Idaho Falls district above the station appropriate practically the entire normal summer flow of the river.

Regulation.—Natural flow during the irrigation season is augmented by the release of stored flood waters from Jackson Lake for use on Minidoka project.

Accuracy.—Stage-discharge relation practically permanent. Rating curve referred to hook gage well defined between 1,900 and 12,000 second-feet. Daily discharge ascertained by applying to rating table mean daily gage heights determined by inspection of gage-height graph. Records good.

Discharge measurements of Snake River near Shelley, Idaho, during the year ending Sept. 30, 1915.

Date.	Made by—	Gage height.	Discharge.	Date.	Made by—	Gage height.	Discharge.
		Feet.	*Sec.-ft.*			*Feet.*	*Sec.-ft.*
Mar. 18	Baldwin and Roush..	5.93	3,510	July 10	G. C. Baldwin.......	7.52	8,480
23	L. W. Roush.........	5.85	3,220	16	.....do...............	6.27	4,300
Apr. 20	G. C. Baldwin.......	7.49	7,670	29	.....do...............	5.12	2,040
May 29	A. W. Harrington....	8.34	10,900	Sept. 20	A. W. Harrington....	5.44	2,450
June 1	.....do...............	8.19	10,300				

Note.—All gage heights referred to hook gage in float well.

Daily discharge, in second-feet, of Snake River near Shelley, Idaho, for the year ending Sept. 30, 1915.

Day.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.
1	....	3,750	8,340	10,400	8,840	2,180	1,960
2	....	3,620	8,680	11,400	8,840	2,740	1,860
3	....	3,750	8,340	14,300	8,510	3,160	1,880
4	....	4,260	7,530	15,100	8,510	3,320	2,010
5	....	4,940	6,890	15,100	8,020	3,230	2,280
6	....	5,380	6,420	14,700	7,690	3,580	2,530
7	....	5,090	6,120	13,900	7,850	4,800	2,510
8	....	4,940	5,670	12,800	8,020	5,090	2,480
9	....	5,090	5,380	11,400	8,020	4,800	2,430
10	....	5,230	5,090	10,400	8,020	4,120	2,430
11	....	5,380	5,090	9,680	8,020	4,260	2,380
12	....	5,520	5,230	9,010	6,730	4,260	2,400
13	....	5,670	5,380	8,510	5,520	3,870	2,620
14	....	5,820	5,520	8,510	5,090	3,750	2,650
15	....	6,270	6,420	7,690	4,660	3,750	2,650
16	....	6,890	7,200	6,420	4,260	3,870	2,620
17	....	7,530	6,890	5,520	3,600	2,920	2,600
18	3,510	7,690	6,270	4,940	3,140	2,630	2,550
19	3,510	7,690	6,890	4,800	2,780	2,560	2,500
20	3,510	8,020	8,340	4,940	2,460	2,560	2,460
21	3,280	8,340	8,680	4,800	2,370	2,430	2,450
22	3,280	8,680	9,010	4,660	2,280	2,480	2,320
23	3,280	9,010	9,680	4,530	2,250	2,710	2,250
24	3,390	9,010	10,000	4,530	2,180	2,780	2,250
25	3,390	8,340	10,000	4,800	2,140	2,840	2,340
26	3,510	8,020	10,700	5,820	2,210	2,860	2,370
27	3,620	7,530	11,400	7,850	2,370	2,860	2,710
28	3,480	7,200	11,100	9,010	2,380	2,740	3,600
29	3,460	7,040	10,700	9,010	2,020	2,630	4,120
30	3,750	7,530	10,400	8,680	2,020	2,260	4,120
31	4,000	....	10,400	....	1,990	2,080	....

NOTE.—Discharge Mar. 19 and Sept. 19 interpolated on account of lack of gage heights.

Monthly discharge of Snake River near Shelley, Idaho, for the year ending Sept. 30, 1915.

Month.	Discharge in second-feet.			Run-off (total in acre-feet).	Accuracy.
	Maximum.	Minimum.	Mean.		
March 18-31	4,000	3,280	3,500	97,200	A.
April	9,010	3,620	6,440	383,000	A.
May	11,400	5,090	7,860	483,000	A.
June	15,100	4,530	8,770	522,000	A.
July	8,840	1,990	4,930	303,000	A.
August	5,090	2,080	3,230	199,000	A.
September	4,000	1,860	2,540	151,000	A.
The period	....	....	....	2,140,000	

SNAKE RIVER AT FIRTH, IDAHO.

Location.—In sec. 24, T. 1 S., R. 36 E., 200 feet below county bridge, about three-fourths mile north of Firth, Bingham County, about 10 miles downstream from Woodville bridge.

Drainage area.—Not measured.

Records available.—October 1, 1914, to May 15, 1915, when the station was discontinued. Records at this station are comparable with those at the station near Shelley established March 18, 1915.

Gage.—Inclined staff on right bank; read by G. W. Cederberg.

Discharge measurements.—Made from highway bridge.

Channel and control.—One channel except at extreme high stages. Control is a gravel bar; permanent during period of record.

Winter flow.—Stage-discharge relation seriously affected by ice December to March.

Extremes of discharge.—Maximum stage recorded during period of record, 6.2 feet at 6 a. m. and 5 p. m., April 23 (discharge, 9,350 second-feet); minimum stage 3.9 feet at 11 a. m. December 16 (stage-discharge relation affected by ice, discharge less than 3,000 second-feet).

Diversions.—Practically all the natural summer flow is diverted above the station.

Regulation.—During irrigation season water is released from Jackson Lake reservoir for use on the Minidoka project.

Accuracy.—Stage-discharge relation constant except from December 13 to March 7, when it was affected by ice. Rating curve well defined between 3,000 and 12,000 second-feet. Gage read to half tenths twice daily. Daily discharge ascertained by applying mean gage heights to rating table. Records, except those for winter, good.

Discharge measurements of Snake River at Firth, Idaho, during the period Sept. 28, 1914, to May 28, 1915.

Date.	Made by—	Gage height.	Discharge.	Date.	Made by—	Gage height.	Discharge.
1914.		*Feet.*	*Sec.-ft.*	1915.		*Feet.*	*Sec.-ft.*
Sept. 28	C. G. Paulsen	5.00	5,360	Mar. 18	G. C. Baldwin	4.17	3,380
Oct. 26	L. W. Roush	5.19	5,800	Apr. 19	.....do	5.72	7,450
				May 28	A. W. Harrington	6.68	11,800

Daily discharge, in second-feet, of Snake River at Firth, Idaho, for the year ending Sept. 30, 1915.

Day.	Oct.	Nov.	Dec.	Mar.	Apr.	May.	Day.	Oct.	Nov.	Dec.	Mar.	Apr.	May.
1	5,330	5,900	5,330	....	3,450	7,850	16	5,900	5,610	....	3,450	6,510	....
2	5,330	5,900	4,310	....	3,450	8,960	17	5,900	5,330	....	3,260	7,160	....
3	5,330	5,900	4,800	....	3,450	8,580	18	5,900	4,800	....	3,450	7,500	....
4	5,900	5,900	5,060	....	3,860	7,850	19	5,900	5,330	....	3,260	7,500	....
5	6,200	5,900	5,330	....	4,550	7,160	20	6,510	5,330	....	3,260	7,850	....
6	6,200	5,900	5,060	....	4,800	6,510	21	6,510	5,330	....	3,260	8,210	....
7	6,510	5,900	5,060	....	4,800	6,200	22	6,510	5,330	....	3,260	8,960	....
8	6,510	5,900	4,800	3,450	4,550	5,610	23	6,200	5,330	....	3,260	9,350	....
9	6,510	5,900	4,800	3,450	4,550	5,330	24	5,900	5,330	....	3,260	9,350	....
10	6,200	5,900	4,080	3,450	4,800	4,800	25	5,900	5,330	....	3,450	8,580	....
11	5,900	5,610	4,310	3,450	4,800	4,800	26	5,900	5,330	....	3,450	7,850	....
12	6,200	5,610	3,650	3,450	5,060	5,060	27	5,900	5,330	....	3,450	7,500	....
13	6,510	5,610	....	3,450	5,330	5,060	28	5,900	5,330	....	3,260	7,160	....
14	6,200	5,610	....	3,450	5,330	5,330	29	5,900	5,060	....	3,260	7,160	....
15	5,900	5,610	....	3,450	5,900	5,900	30	5,900	5,330	....	3,450	7,500	....
							31	5,900	....	....	3,650	....	....

Note.—Stage-discharge relation affected by ice Dec. 13 to Mar. 7. Mean discharge estimated from observer's notes, climatic data, and records of flow at other stations on Snake River as follows: Dec. 13-31 3,140 second-feet; Jan. 1 to Mar. 7, 3,300 second-feet.

Monthly discharge of Snake River at Firth, Idaho, for the year ending Sept. 30, 1915.

Month.	Discharge in second-feet.			Run-off (total in acre-feet).	Accuracy.
	Maximum.	Minimum.	Mean.		
October	6,510	5,330	6,040	371,000	A.
November	5,900	4,800	5,550	330,000	A.
December	5,330	....	3,750	231,000	B.
January	....	....	3,300	203,000	C.
February	....	....	3,300	183,000	C.
March	3,650	3,260	3,370	207,000	B.
April	9,350	3,450	6,230	371,000	A.
May 1-15	8,960	4,800	6,330	188,000	A.
The period	....	....	....	2,080,000	

NOTE.—See footnote to table of daily discharge.

SNAKE RIVER NEAR BLACKFOOT, IDAHO.

LOCATION.—In sec. 31, T. 3 S., R. 34 E., about one-fourth mile below mouth of Blackfoot River and 14 miles southwest of Blackfoot, Bingham County. Blackfoot River is the only large tributary between the station and the mouth of Henrys Fork, about 60 miles above. Portneuf and Bannock rivers, together with about 2,500 second-feet of spring water, enter between this station and that at Neeley.

DRAINAGE AREA.—Not measured.

RECORDS AVAILABLE.—June 6, 1910, to September 30, 1915.

GAGE.—Friez water-stage recorder on right bank; installed July 6, 1913, at same location and datum as staff gage installed October 1, 1912. Original gage used June 6, 1910, to September 30, 1912, was 50 feet above present site. Datum of gage raised 0.06 foot on June 25, 1911, and 0.03 foot on October 1, 1912, when new staff was installed. Observer, James A. Clough.

DISCHARGE MEASUREMENTS.—Made from cable about 50 feet above gage or by wading.

CHANNEL AND CONTROL.—Bed composed of very coarse gravel; two channels at low and three at medium stages. Control shifts slightly during high water but was permanent during 1915.

WINTER FLOW.—Floating ice sometimes present for short periods; stage-discharge relation apparently not affected.

EXTREMES OF DISCHARGE.—Maximum stage recorded during year 8.55 feet at 6 a. m. June 5 (discharge, 15,800 second-feet); minimum stage recorded, 1.98 feet at 5 p. m. July 27 (discharge 388 second-feet).

1910–1915: Maximum stage recorded 12.63 feet at noon June 8, 1914 (discharge 35,600 second-feet); minimum stage 1.89 feet August 11 and 15, 1910 (discharge, 238 second-feet).

DIVERSIONS.—Practically all the natural summer flow diverted above the station.

REGULATION.—Flow regulated by storage in Jackson Lake reservoir and also by storage in Blackfoot-Marsh reservoir on Blackfoot River. Practically all of present summer flow is released water from these reservoirs.

ACCURACY.—Stage-discharge relation permanent during year. Rating curve well defined between 400 and 20,000 second-feet. Operation of water-stage recorder satisfactory except as noted in footnote to table of daily discharge. Discharge ascertained by applying to rating table mean daily gage heights obtained by inspection of gage-height graph October 1 to July 19, August 4 to 28, and September 13 to 30; July 20 to August 3, gage heights derived from graph drawn through daily staff-gage readings; August 29 to September 12 gage heights obtained by one reading a day. Records good throughout year.

Discharge measurements of Snake River near Blackfoot, Idaho, during the year ending Sept. 30, 1915.

Date.	Made by—	Gage height.	Dis-charge.	Date.	Made by—	Gage height.	Dis-charge.
		Feet.	*Sec.-ft.*			*Feet.*	*Sec.-ft.*
Mar. 25	G. C. Baldwin	4.51	3,130	July 12	G. C. Baldwin	5.90	6,200
Apr. 22	.....do	6.41	7,610	Aug. 1	.....do	2.02	407
May 25	A. W. Harrington	7.06	9,730	Sept. 9	A. W. Harrington	2.88	1,130
July 12	G. C. Baldwin	5.95	6,580				

Daily discharge, in second-feet, of Snake River near Blackfoot, Idaho, for the year ending Sept. 30, 1915.

Day.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.
1	4,920	6,100	5,250	3,880	3,600	3,700	3,600	6,760	10,200	6,620	419	604
2	5,020	6,100	5,020	3,880	3,700	3,700	3,420	7,760	10,600	6,900	642	532
3	5,250	6,230	5,140	3,880	3,790	3,790	3,420	7,760	13,400	6,490	1,430	498
4	5,480	6,230	5,370	3,880	3,790	3,700	3,600	7,180	15,100	6,490	1,750	532
5	5,850	6,100	5,480	3,700	3,600	3,600	4,180	6,620	15,600	6,360	2,030	604
6	6,100	6,100	5,370	3,600	3,600	3,600	4,800	5,980	15,100	6,230	1,900	844
7	6,230	6,100	5,370	3,790	3,420	3,700	4,920	5,480	15,100	6,100	2,840	978
8	6,360	6,100	5,250	3,790	3,160	3,700	4,590	5,020	13,800	6,230	3,700	978
9	6,360	6,100	4,920	3,790	3,080	3,600	4,590	4,590	12,200	6,230	3,980	1,120
10	6,230	5,980	4,080	3,700	3,250	3,520	4,700	4,080	10,600	6,490	4,180	1,170
11	6,100	5,850	3,880	3,880	3,340	3,420	4,800	3,880	9,180	6,620	3,600	1,120
12	6,230	5,850	4,080	4,080	3,420	3,340	4,920	3,880	7,910	6,100	3,250	1,020
13	6,230	5,850	3,700	3,880	3,420	3,340	5,140	4,080	7,320	4,700	2,450	1,380
14	6,230	5,850	4,180	4,080	3,520	3,340	5,140	4,180	6,760	3,980	2,100	1,510
15	5,980	5,850	3,980	3,880	3,520	3,340	5,370	4,700	6,230	3,420	2,240	1,620
16	5,850	5,720	3,080	3,790	3,520	3,340	5,850	5,600	5,020	2,680	2,600	1,640
17	5,720	5,370	2,840	3,600	3,520	3,250	6,360	5,850	3,880	2,030	2,380	1,690
18	5,850	5,250	3,080	3,600	3,420	3,250	6,900	5,250	3,160	1,660	1,680	1,630
19	5,850	5,480	2,920	3,340	3,520	3,250	6,900	5,020	2,680	1,430	1,420	1,630
20	6,100	5,480	2,920	3,250	3,700	3,250	7,040	6,360	2,520	1,170	1,450	1,560
21	6,360	5,480	3,000	3,420	3,790	3,250	7,320	7,460	2,600	969	1,620	1,540
22	6,360	5,250	2,840	3,340	3,790	3,160	7,610	7,910	2,450	794	1,450	1,530
23	6,230	5,370	2,920	3,340	3,790	3,160	8,530	8,860	2,160	688	1,600	1,510
24	5,980	5,250	2,840	3,250	3,700	3,160	8,530	9,520	2,030	642	1,840	1,500
25	5,850	5,250	2,920	2,840	3,880	3,250	7,910	9,880	2,030	546	1,840	1,540
26	5,720	5,250	3,160	2,680	3,790	3,420	7,460	10,200	2,450	438	1,840	1,840
27	5,600	5,250	3,420	2,760	3,700	3,520	6,900	11,000	3,880	388	1,720	2,300
28	5,600	5,250	3,600	2,920	3,700	3,340	6,360	11,000	6,490	604	1,600	3,080
29	5,850	5,250	3,420	3,340	....	3,250	5,980	10,600	7,040	696	1,170	3,880
30	5,850	5,250	3,790	3,790	....	3,420	6,100	10,200	6,900	597	888	4,080
31	5,980	....	3,790	3,700	....	3,600	....	10,200	....	445	720	....

NOTE.—Discharge estimated July 28 and Aug. 2 and 3 on account of rapidly changing stage.

Monthly discharge of Snake River near Blackfoot, Idaho, for the year ending Sept. 30, 1915.

Month.	Discharge in second-feet.			Run-off (total in acre-feet).	Accuracy.
	Maximum.	Minimum.	Mean.		
October	6,360	4,920	5,910	363,000	A.
November	6,230	5,250	5,680	338,000	A.
December	5,480	2,840	3,920	241,000	B.
January	4,080	2,680	3,570	220,000	B.
February	3,880	3,080	3,570	198,000	A.
March	3,790	3,160	3,430	211,000	A.
April	8,530	3,420	5,760	343,000	A.
May	11,000	3,880	7,000	430,000	A.
June	15,600	2,030	7,480	445,000	A.
July	6,900	388	3,380	208,000	A.
August	4,180	419	2,010	124,000	A.
September	4,080	498	1,520	90,400	A.
The year	15,600	388	4,440	3,210,000	

SNAKE RIVER AT NEELEY, IDAHO.

Location.—In sec. 11, T. 8 S., R. 30 E., half a mile north of Neeley post office, Power County, 4 miles southwest of American Falls, and about 32 miles above the Minidoka dam. Portneuf and Bannock rivers and about 2,500 second-feet of spring water enter Snake River between the Blackfoot gaging station and Neeley. Raft River enters about 18 miles below Neeley.

Drainage area.—Not measured.

Records available.—March 17, 1906, to September 30, 1915.

Gage.—Friez water-stage recorder installed August 8, 1910, on left bank at site of staff gage originally used.

Discharge measurements.—Made from cable at gage.

Channel and control.—Control is of lava rock, probably partly overlain with coarse gravel; permanent during 1915. Bed of river at measuring section is rough, especially near right bank. Both banks are high and clean. One channel at all stages.

Winter flow.—Stage-discharge relation seriously affected by ice during parts of December and January; flow estimated principally by comparison with the record of flow at the Blackfoot station.

Extremes of discharge.—Maximum stage during year from water-stage recorder, 8.22 feet at 11 p. m., June 6 (discharge, 17,400 second-feet); minimum stage, 3.98 feet at 9 p. m., July 26 (discharge 2,750 second-feet).

1906–1915: Maximum stage recorded, 12.5 feet June 11, 1909 (discharge, 41,100 second-feet); minimum stage recorded, 3.65 feet August 20–22, 1906 (discharge, 2,220 second-feet).

Diversions.—Numerous canals in the vicinity of Blackfoot and Idaho Falls divert practically the entire natural summer flow of Snake River.

Regulation.—The summer flow at this station is augmented by stored water from Jackson Lake for use on the Minidoka project, and also by stored water from the Blackfoot-Marsh reservoir.

Accuracy.—Stage-discharge relation permanent during year except when affected by ice. Rating curve well defined. Operation of water-stage recorder satisfactory except for short periods as noted in foot-note to table of daily discharge. Discharge ascertained by applying to rating table mean daily gage heights obtained by inspection of gage-height graph (for exceptions see footnote to table of daily discharge). Records fair for December; good for rest of year.

Discharge measurements of Snake River at Neeley, during the year ending Sept. 30, 1915.

Date.	Made by—	Gage height.	Discharge.	Date.	Made by—	Gage height.	Discharge.
		Feet.	*Sec.-ft.*			*Feet.*	*Sec.-ft.*
Jan. 13	L. W. Roush	5.41	6,190	Aug. 2	G. C. Baldwin	4.02	2,790
Mar. 28	G. C. Baldwin	5.30	5,960	Sept. 7	Harrington and Cotton.[a]	4.23	3,280
June 16	A. W. Harrington	5.98	8,160				
				8	A. W. Harrington	4.31	3,240

[a] Special deputy State engineer.

Daily discharge, in second-feet, of Snake River at Neeley, Idaho, for the year ending Sept. 30, 1915.

Day.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.
1	7,170	8,530	8,010	......	5,920	6,380	6,220	8,890	12,400	8,530	2,860	3,030
2	7,840	8,530	7,840	......	6,220	6,380	6,070	9,440	12,400	8,530	2,780	2,940
3	8,010	8,530	7,840	......	6,380	6,380	5,920	10,400	13,700	8,710	3,030	2,860
4	8,360	8,530	7,840	......	6,220	6,380	5,920	10,400	15,900	8,360	3,760	2,860
5	8,530	8,530	7,840	......	6,070	6,380	6,220	9,620	17,300	8,530	4,000	2,860
6	8,890	8,530	7,840	......	5,770	6,220	6,850	8,890	17,300	8,530	4,120	2,940
7	9,070	8,530	7,840	......	6,070	6,070	7,340	8,360	17,300	8,360	4,120	3,120
8	9,070	8,530	7,840	......	5,770	6,070	7,340	7,670	16,300	8,180	5,190	3,320
9	8,890	8,530	7,510	......	5,620	6,070	7,170	7,170	15,400	8,360	5,920	3,320
10	8,710	8,530	7,180	......	5,620	6,070	7,170	6,690	13,700	8,530	6,070	3,320
11	8,530	8,530	6,860	......	5,770	5,920	7,340	6,220	12,400	8,710	6,070	3,420
12	8,530	8,530	6,530	......	5,920	5,770	7,340	6,220	11,200	8,710	5,620	3,320
13	8,710	8,360	......	6,380	6,070	5,920	7,500	6,220	10,000	7,840	5,190	3,320
14	8,710	8,360	......	6,380	6,070	5,920	7,670	6,380	9,440	6,690	4,510	3,530
15	8,530	8,360	......	6,380	6,070	5,920	7,670	6,530	8,890	6,070	4,250	3,760
16	8,360	8,360	5,950	6,070	6,070	5,920	8,010	7,340	8,180	5,480	4,380	3,880
17	8,180	8,010	......	5,920	6,220	5,770	8,530	8,010	7,010	4,780	4,780	3,880
18	8,180	7,840	......	5,770	6,070	5,770	9,070	7,840	5,770	4,250	4,250	3,880
19	8,180	7,840	......	5,770	6,070	5,770	9,440	7,500	5,050	3,880	3,760	3,760
20	8,360	7,840	......	5,480	6,220	5,770	9,440	8,180	4,780	3,640	3,640	3,760
21	8,710	7,840	......	5,620	6,380	5,770	9,620	9,620	4,780	3,420	3,640	3,760
22	8,710	7,840	......	5,620	6,530	5,770	10,000	10,000	4,780	3,320	3,640	3,760
23	8,710	7,840	......	......	6,530	5,620	10,800	10,800	4,510	3,120	3,530	3,640
24	8,710	7,840	......	......	6,380	5,770	11,200	11,600	4,250	3,030	3,760	3,640
25	8,530	8,010	......	......	6,380	5,770	11,200	12,600	4,120	2,940	4,000	3,760
26	8,530	8,010	......	5,330	6,530	5,770	10,400	12,000	4,120	2,860	4,000	4,000
27	8,360	8,010	......	5,190	6,380	5,920	10,000	12,800	4,640	2,780	3,880	4,510
28	8,180	8,010	......	5,330	6,380	5,920	9,440	13,200	6,690	2,780	3,880	4,780
29	8,360	8,010	......	5,620	......	5,920	8,890	13,200	8,530	2,940	3,640	5,620
30	8,530	8,010	......	6,220	......	5,920	8,530	12,800	8,890	3,030	3,320	6,220
31	8,530	......	......	6,220	......	6,070	......	12,400	......	2,940	3,220	......

NOTE.—Stage-discharge relation affected by ice during part of December and January. No gage height record Oct. 9, Nov. 1-6, 22-27, Nov. 29 to Dec. 4, Dec. 9-11, 13-18, 20-31, Jan. 1, 3-8, and 10-12; discharge interpolated or estimated. Mean discharge estimated from observer's notes, climatic data, and record of flow at Blackfoot station, as follows: Dec. 13-15, 6,500 second-feet; Dec. 16, 5,950 second-feet; Dec 17-25, 5,400 second-feet; Dec. 26-28, 5,800 second-feet; Dec. 29-31, 6,150 second-feet; Jan. 1-12, 6,350 second-feet; Jan. 23-25, 5,500 second-feet

Monthly discharge of Snake River at Neeley, Idaho, for the year ending Sept. 30, 1915.

Month.	Discharge in second-feet.			Run-off (total in acre-feet).	Accuracy.
	Maximum.	Minimum.	Mean.		
October	9,070	7,170	8,470	521,000	A.
November	8,530	7,840	8,220	489,000	B.
December	......	......	6,480	398,000	C.
January	......	5,190	6,000	369,000	B.
February	6,530	5,620	6,130	340,000	A.
March	6,380	5,620	5,970	367,000	A.
April	11,200	5,920	8,280	493,000	A.
May	13,200	6,220	9,300	572,000	A.
June	17,300	4,120	9,660	575,000	A.
July	8,710	2,780	5,740	353,000	A.
August	6,070	2,780	4,160	266,000	A.
September	6,220	2,860	3,690	220,000	A.
The year	17,300	2,780	6,840	4,950,000	

NOTE.—See footnote to table of daily discharge.

SNAKE RIVER NEAR MINIDOKA, IDAHO.

Location.—In sec. 2, T. 9 S., R. 25 E., 100 yards below Howell's ferry, 1 mile below the Reclamation Service dam, 6 miles southeast of Minidoka post office, Minidoka County, the nearest railroad point, and about 6 miles above the Montgomery's ferry station, which was discontinued December 31, 1910. Raft River enters between the stations at Neeley and Minidoka.

Drainage area.—Not measured.

Records available.—April 21, 1910, to September 30, 1915.

Gage.—Friez water-stage recorder located on right bank directly across river and at same datum as staff gage used prior to August 28, 1911; also Stevens long-distance recorder installed April 1, 1915. G. H. Horne, observer.

Discharge measurements.—Made from cable about 50 feet below the gage.

Channel and control.—One channel at all stages; bed composed of coarse gravel. Control shifts slightly but infrequently.

Winter flow.—Some shore ice appears in vicinity of gage; stage-discharge relation believed to have been unaffected during winter of 1914–15.

Extremes of discharge.—Maximum stage recorded during year, 10.90 feet from 4 to 5 p. m., November 15 (discharge, 21,800 second-feet); minimum stage recorded, 4.05 feet from 11 a. m. to 3 p. m. October 13 (discharge, 960 second-feet).

1910–1915: Maximum stage recorded, 14.18 feet from 4 to 5 p. m. June 8, 1914 (discharge, 36,400 second-feet); minimum stage, 4.05 feet from 11 a. m. to 3 p. m. October 13, 1914 (discharge, 960 second-feet).

Diversions.—The North and South Side Minidoka canals divert water between the Neeley and Minidoka stations (see pp. 81–84). The nearest diversions below the station are the Twin Falls North Side and South Side canals at Milner (see pp. 90–94).

Regulation.—Flow entirely regulated by storage above Minidoka dam (storage capacity, 54,000 acre-feet).

Accuracy.—Stage-discharge relation changed somewhat between January 28 and March 30. Rating curves well defined. Operation of water-stage recorder satisfactory except for short periods during the winter months. From October to March repairs were being made to the spillway and tailrace at the dam and water was stored during the day and released at night; discharge for practically all days during this period determined hourly. See note to table of daily discharge. Records good except for December.

Cooperation.—United States Reclamation Service furnished gage-height record and made two discharge measurements.

Discharge measurements of Snake River near Minidoka, Idaho, during the year ending Sept. 30, 1915.

Date.	Made by—	Gage height.	Discharge.	Date.	Made by—	Gage height.	Discharge.
		Feet.	*Sec.-ft.*			*Feet.*	*Sec.-ft.*
Jan. 28	L. W. Roush	[a] 6.36	4,970	July 10	J. S. Longwell [b]	5.56	3,650
Mar. 30	Baldwin and Longwell.	6.75	6,410	20	A. W. Harrington	5.04	2,610
30	G. C. Baldwin	6.66	6,100	21	do	5.23	2,950
May 21	A. W. Harrington	6.76	5,970	29	Aylor [b] and Stearman [b]	4.68	2,120
22	do	7.12	7,190				

[a] Stage-discharge relation slightly affected by ice.

[b] Employee of United States Reclamation Service.

Daily discharge, in second-feet, of Snake River near Minidoka, Idaho, for the year ending Sept. 30, 1915.

Day.	Oct.	Nov.	Dec.	Jan	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept
1	7,740	6,060	12,600	7,220	7,050	6,110	5,960	7,000	10,400	4,870	2,070	2,000
2	8,350	5,730	10,000	7,000	5,780	5,890	5,900	7,280	9,680	5,100	2,070	2,070
3	8,670	8,040	8,670	6,800	6,460	6,300	5,830	7,560	10,400	5,100	2,070	2,000
4	8,350	8,730	7,630	6,640	6,460	5,670	5,830	8,140	13,400	5,100	2,210	2,070
5	8,040	9,250	6,610	7,380	6,330	7,480	5,700	8,430	15,800	4,310	2,210	2,070
6	8,040	7,880	7,240	5,950	6,190	6,090	5,700	7,840	16,200	3,990	2,360	2,070
7	8,040	7,110	8,190	6,320	6,050	5,820	6,210	6,470	15,000	4,420	3,880	2,140
8	8,040	3,110	....	5,980	6,640	6,990	6,470	6,470	15,400	3,580	3,480	2,070
9	8,350	5,480	....	6,580	6,310	4,760	6,470	6,210	14,200	3,480	3,580	2,000
10	8,350	7,280	....	6,500	5,700	6,080	6,470	5,580	11,400	3,680	3,380	1,940
11	8,040	8,880	....	6,010	6,350	6,870	6,470	5,100	7,840	3,680	3,580	1,940
12	6,860	5,080	....	8,340	5,830	6,340	6,210	4,760	8,140	3,780	3,190	2,140
13	5,740	4,250	4,650	7,830	5,780	6,210	6,080	4,760	8,140	3,880	2,140	2,840
14	6,580	9,710	6,740	6,890	7,270	6,210	6,340	4,760	6,210	3,380	2,070	2,920
15	9,640	15,000	8,990	5,740	6,480	6,080	6,340	4,420	5,220	3,880	2,140	3,190
16	11,400	9,490	6,430	5,900	6,350	6,340	6,210	4,200	5,830	3,990	2,070	3,580
17	9,800	7,550	4,990	6,570	5,790	6,210	6,210	4,640	5,220	4,530	2,070	3,580
18	9,280	7,610	2,740	6,460	6,260	5,960	6,740	5,100	3,680	3,380	2,140	3,480
19	8,850	7,740	3,120	6,560	6,850	6,340	7,280	5,460	4,530	2,670	2,070	3,680
20	9,500	7,340	3,100	6,440	7,710	6,080	7,560	5,960	5,830	2,670	2,070	3,280
21	9,970	8,700	3,000	6,360	6,940	6,080	7,560	6,470	5,580	2,920	2,070	3,190
22	9,090	7,200	2,800	5,330	6,520	5,960	7,840	7,560	5,460	2,750	2,070	3,380
23	8,680	6,260	2,740	....	5,670	5,830	7,840	8,140	4,980	2,750	2,070	3,580
24	8.400	7,750	3,700	....	6,520	5,830	8,430	9,040	4,980	2,750	2,000	3.680
25	8,340	9,630	4,650	....	7,790	6,080	8,730	9,680	5,100	2,430	2,000	3,680
26	8,040	7,430	5,360	....	6,460	5,830	8,730	10,700	4,760	2,140	1,940	3,480
27	8,140	7,570	4,880	....	6,530	5,830	8,140	11,100	4,640	2,140	1,940	2,840
28	8,240	7,440	5,880	5,110	6,650	6,080	7,560	11,400	4,870	2,140	1,940	2,280
29	8,340	5,810	5,880	5,480	....	5,960	6,740	11,800	4,870	2,140	1,880	2,280
30	6,090	10,700	5,880	6,890	....	6,340	6,470	11,800	4,870	2,070	1,940	3,280
31	5,290	....	6,500	7,000	....	5,960	....	11,100	....	2,070	1,940	....

NOTE.—Discharge determined as follows: Oct 1 to Jan. 29 and Mar. 9 to Sept. 30, from two well-defined rating curves; Jan. 30 to Mar. 8 by shifting-control method; Nov. 15, 20, Dec. 8–12, 20–22, 24, 29, 31, Jan. 2, 3, 23–27, and 31, estimated, the mean discharge Dec. 8–12 and Jan. 23–27 being estimated at 6,000 second-feet; discharge Dec. 23, 25–28, and 30, obtained from one gage reading a day; discharge Oct. 12 to Nov. 14, Nov. 16–21, 23–30, Dec. 4–7, 14, Jan. 1, 4–12, Feb. 1, and Feb. 8 to Mar. 8 is the mean of 24 hourly determinations of discharge for each day.

Monthly discharge of Snake River near Minidoka, Idaho, for the year ending Sept. 30, 1915.

Month.	Discharge in second-feet.			Run-off (total in acre-feet).	Accuracy.
	Maximum.	Minimum.	Mean.		
October	11,400	5,290	8,270	508,000	A.
November	15,000	3,110	7,660	456,000	A.
December	12,600	2,740	5,900	363,000	C.
January	8,340	5,110	6,430	395,000	B.
February	7,790	5,670	6,450	358,000	B.
March	7,480	4,760	6,080	374,000	A.
April	8,730	5,700	6,800	405,000	A.
May	11,800	4,200	7,380	454,000	A.
June	16,200	3,680	8,090	481,000	A.
July	5,100	2,070	3,410	210,000	A.
August	3,880	1,880	2,340	144,000	A
September	3,680	1,940	2,760	164,000	A
The year	16,200	1,880	5,960	4,310,000	

LAKE MILNER AT MILNER, IDAHO.

LOCATION.—In sec. 29, T. 10 S., R. 21 E., in the backwater of Twin Falls companies' dam at Milner, Cassia County.

RECORDS AVAILABLE.—April 10, 1911, to September 30, 1915.

Gage.—Staff gage at dam. A Lietz and a Friez water-stage recorder have also been used for short periods. All gages referred to same datum.

Accuracy.—Gage heights occasionally seriously affected by wind.

Cooperation.—Gage-height record furnished by the Twin Falls North Side Land & Water Co. and the Twin Falls Canal Co.

Daily gage height, in feet, of Lake Milner at Milner, Idaho, for the year ending Sept. 30, 1915.

Day.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.
1	8.50	7.50	10.25	8.70	8.65	7.00	6.80	....	9.95	9.40	9.02	9.82
2	9.95	9.60	9.70	8.65	8.50	6.40	6.85	9.50	9.65	9.50	9.02	9.74
3	8.50	8.40	8.90	8.65	7.70	5.70	6.90	9.85	8.90	9.70	8.98	9.79
4	8.30	7.65	8.35	8.50	7.70	6.70	7.10	9.80	10.05	9.70	8.90	9.70
5	8.40	7.75	8.25	8.90	7.90	7.60	8.25	9.80	9.95	9.78	8.90	9.64
6	8.38	8.10	8.55	8.50	8.00	8.70	8.15	9.80	10.00	9.35	8.90	9.54
7	9.20	7.60	8.95	8.40	8.00	7.05	8.05	9.65	9.75	9.56	9.25	9.24
8	9.50	7.50	9.10	8.70	7.90	7.40	8.15	9.45	9.85	9.79	9.61	9.31
9	9.30	7.75	8.50	8.60	8.20	6.90	8.40	9.80	9.75	9.43	9.62	9.17
10	9.00	6.35	8.25	8.75	8.20	6.65	8.05	9.65	9.22	9.54	9.66	9.02
11	8.85	7.90	8.10	8.60	8.00	7.50	7.85	9.50	9.60	9.48	9.46	8.54
12	8.50	8.68	7.50	8.70	8.00	8.05	7.90	9.60	9.70	9.40	9.46	8.06
13	8.20	7.75	6.80	8.65	7.75	8.10	8.00	9.60	9.65	9.20	9.06	7.78
14	8.00	6.00	7.10	8.60	7.55	8.00	8.30	9.65	9.88	9.00	8.33	8.04
15	8.75	9.90	9.25	8.85	8.45	8.10	8.40	9.70	9.55	8.89	8.12	8.20
16	10.00	9.80	8.85	8.25	8.55	8.25	8.00	9.80	9.60	9.40	8.20	8.41
17	9.00	6.90	8.80	8.35	7.75	8.30	6.90	9.82	9.50	9.32	8.32	8.59
18	8.79	6.60	8.40	8.75	7.50	8.10	7.10	9.65	9.58	9.74	8.44	8.66
19	7.90	7.40	7.75	8.80	7.70	8.50	8.90	9.45	9.65	9.73	8.58	8.59
20	7.60	7.70	7.10	8.80	8.20	8.20	9.00	9.85	9.60	9.52	8.76	8.57
21	8.60	7.68	7.40	8.70	7.70	7.90	9.20	9.80	9.50	9.34	8.88	8.44
22	8.10	8.60	7.75	8.65	7.20	7.80	9.25	9.90	9.76	9.42	9.04	8.30
23	7.85	7.90	8.90	7.90	6.70	7.80	9.35	9.90	9.90	9.20	9.20	8.31
24	7.80	6.90	8.75	7.60	7.00	7.35	9.40	9.85	9.83	9.20	9.36	8.22
25	7.75	8.00	8.80	7.80	7.70	7.35	9.35	9.75	9.55	9.15	9.50	8.22
26	7.60	8.00	8.85	8.10	7.70	7.40	9.40	....	9.90	9.18	9.74	8.37
27	7.70	8.60	8.85	8.20	6.80	8.50	9.25	....	9.85	9.24	9.84	8.68
28	7.88	8.10	9.00	8.15	7.00	7.85	9.35	....	9.80	9.15	9.92	9.36
29	7.90	8.20	9.25	7.90	....	7.90	9.55	....	9.75	9.08	9.66	9.66
30	8.00	7.20	8.90	8.10	....	7.70	9.50	9.82	9.68	9.05	9.69	9.84
31	7.00	....	8.80	8.90	....	7.20	....	9.90	....	8.96	9.77	....

Note.—All readings from staff gage.

SNAKE RIVER AT MILNER, IDAHO.

Location.—In sec. 29, T. 10 S., R. 21 E., about 300 yards below the Milner dam, at Milner, Twin Falls County. No tributaries enter Snake River between the Minidoka station and Milner, and no important amount of water between Milner and the station near Twin Falls, except some seepage and spring water.

Drainage area.—Not measured.

Records available.—May 10, 1909, to September 30, 1915.

Gage.—Staff gage in three sections, high and low sections vertical, and middle inclined, on left bank, installed October 20, 1909; read by F. W. Deming October 1 to June 26 and by T. R. Newell, June 27 to September 30. An auxiliary low-water gage is installed on the right bank about 100 yards below the main gage, to which it bears no definite relation. The original gage used prior to October 20, 1909, was a vertical staff on the right bank at approximately the same datum as the present gage.

Discharge measurements.—Made from a cable at the gage, from foot planks at the auxiliary low water gage, or by wading. Measurements may also be made from the suspension highway bridge one-fourth mile below the main gage, but the conditions there are poor.

Channel and control.—Control for main gage is an old crib-and-rock diversion dam and is practically permanent for medium and high stages. Bed of the stream both at the main gage and at the auxiliary gage consists of lava rock, which also forms the control for the low-water gage.

Winter flow.—Stage-discharge relation not seriously affected by ice; open water rating assumed applicable; observations are, however, discontinued during part of winter as gages are at times inaccessible.

Extremes of discharge.—Maximum stage recorded during year, 16.35 feet at 8 a. m., November 15 (discharge, 20,400 second-feet); minimum stage recorded, −1.08 feet (on auxiliary gage) August 17 and 18 (discharge, 9 second-feet).

1909–1915: Maximum stage recorded, 20.1 feet June 12, 1909 (discharge, 44,400 second-feet); minimum stage recorded, −1.08 feet (on auxiliary gage) August 17–18, 1915 (discharge, 9 second-feet).

Diversions.—The Twin Falls canals divert water at the Milner dam, just above the station. During part of the season practically the entire flow of the river is taken by these canals.

Regulation.—Flow past the station is regulated during the irrigation season at the Milner dam.

Accuracy.—Stage-discharge relation practically permanent during the year. Gage read to hundredths once daily, October 1 to June 26, and twice daily June 27 to September 30. Discharge ascertained by applying mean daily gage heights to rating table. Records good except for April and May when gage was not read regularly.

Cooperation.—Gage-height record furnished by the Twin Falls Canal Co., some discharge measurements by special assistant to State engineer stationed at this station.

Discharge measurements of Snake River at Milner, Idaho, during the year ending Sept. 30, 1915.

Date.	Made by—	Gage height.	Discharge.	Date.	Made by—	Gage height.	Discharge.
		Feet.	*Sec.-ft.*			*Feet.*	*Sec.-ft.*
Nov. 9	L. W. Roush	13.36	8,890	July 29	Harrington and Newell	−0.99	10.9
May 8	G. C. Baldwin	10.09	1,680				
June 15	A. W. Harrington	[a] 4.61	553	Aug. 12	T. R. Newell	− .70	15.2
23	T. R. Newell [b]	− .76	13.4	18	Baldwin and Hoyt	−1.07	9.2
25	do	− .90	11.3	Sept. 15	T. R. Newell	−1.00	10.6
28	do	− .90	11.1	21	do	− .71	14.8
July 12	do	− .90	11.6	29	do	3.00	342
28	do	− .99	10.8				

[a] Main gage read 9.20 feet at end of measurement.

[b] Assistant to State engineer.

Note.—Beginning June 15 gage heights refer to datum of low-water gage.

Daily discharge, in second-feet, of Snake River at Milner, Idaho, for the year ending Sept. 30, 1915.

Day.	Oct.	Nov.	Dec.	Feb.	Mar.	Apr.	May.	June	July	Aug.	Sept.
1	4,890	7,710	18,600		5,910	4,480	1,420	7,840	12	10	13
2	5,640	8,350	13,400		5,910	4,100	1,840	8,000	12	10	13
3	7,370	9,000	8,330		4,660	3,710	2,260	8,170	13	10	14
4	7,060	9,000	7,060		4,440	3,320	2,680	8,330	13	10	14
5	7,060	9,690	7,680		5,130	3,660	2,270		14	10	14
6	7,060	9,690			5,380	3,660	1,860		12	10	14
7	7,370	8,880			5,910	3,660	1,460		12	12	13
8	8,330	8,080			4,440	3,900	1,060		11	16	13
9	9,000	7,280			4,440	4,600			11	16	13
10	9,000	6,470			3,320			9,340	11	16	13
11	8,660	8,330			4,440			4,440	11	15	12
12	8,330	7,400			4,660			3,880	12	15	11
13	7,680	6,470			4,440			3,320	11	14	10
14	7,370	5,910			4,440			2,540	12	13	10
15	5,910	20,700			4,440	4,230		477	11	10	11
16	12,600	19,800			3,660			282	11	10	12
17	11,900	9,690		4,440	4,030			245	11	9	14
18	11,900	9,340		4,440	4,030			187	13	9	14
19	10,400	8,330		4,440	4,890			155	12	10	14
20	9,690	8,660		6,760	5,380			145	12	10	14
21	10,400	8,660		6,760	4,030		2,180	69	11	10	15
22	10,800	9,000		5,910	3,660		3,310	42	11	10	14
23	9,690	8,330		5,130	3,660		4,440	14	11	10	14
24	9,690	7,060		4,440	3,660		4,440	13	11	11	14
25	9,690	9,690		4,890	3,480		5,130	12	11	11	14
26	9,000	8,660		6,470	3,480	4,030	5,640	12	10	12	14
27	8,330	7,060		5,910	6,190	3,270	6,150	13	10	12	14
28	8,330	7,680		5,910	5,910	2,520	6,660	12	10	13	44
29	9,000	7,680			5,640	1,760	7,170	12	10	13	307
30	8,660	7,680			5,250	1,000	7,680	12	10	11	594
31	7,060				4,860		7,680		10	12	

NOTE.—Discharge determined from two fairly well defined rating curves applicable as follows: Oct. 1 to June 17 referred to main gage; June 18 to Sept. 30 referred to low-water gage. Discharge estimated or interpolated on account of lack of gage heights, Nov. 1, 2, 7-9, 12, Mar. 30 to Apr. 3, Apr. 6-9, 27-29, May 1-3, 5-8, 22, 26-29, June 1-3, 22, 24, and 26. Mean discharge estimated from records at other stations as follows: Apr. 10-14, 3,500 second-feet; Apr. 16-25, 3,800 second-feet; May 9-20, 1,050 second-feet; June 5-9, 11,400 second-feet. No record Dec. 6 to Feb. 16.

Monthly discharge of Snake River at Milner, Idaho, for the year ending Sept. 30, 1915.

Month.	Discharge in second-feet.			Run-off (total in acre-feet).	Accuracy.
	Maximum.	Minimum.	Mean.		
October	12,600	4,890	8,640	531,000	B.
November	20,700	5,910	9,010	536,000	B.
December 1-5	18,600	7,060	11,000	109,000	B.
February 17-28	6,760	4,440	5,460	130,000	B.
March	6,190	3,320	4,640	285,000	B.
April	4,600	1,000	3,580	213,000	C.
May	7,680		2,840	175,000	C.
June		12	3,820	227,000	B.
July	14	10	11.4	701	B.
August	16	9	11.6	713	B.
September	594	10	43.3	2,580	B.

NOTE.—See footnote to table of daily discharge.

SNAKE RIVER NEAR TWIN FALLS, IDAHO.

Location.—In sec. 33, T. 9 S., R. 17 E., at Perrine's bridge on the I. B. Perrine Blue Lakes ranch, about 4 miles north of the city of Twin Falls, Twin Falls County, and 4 miles below Shoshone Falls. The outlet of the Blue Lakes enters Snake River about 200 feet below the gage, and Salmon Falls Creek enters about 18 miles below.

Drainage area.—Not measured.

Records available.—September 29, 1911, to September 30, 1915.

Gage.—Inclined staff on left bank, about 100 feet above the bridge; read by employees of I. B. Perrine.

Discharge measurements.—Made from downstream side of bridge.

Channel and control.—Control consists of lava boulders and solid rock, permanent. Bed of river at measuring section is very rough. Banks are high and not subject to overflow.

Winter flow.—Stage discharge relation not seriously affected by ice; open channel rating curve assumed applicable.

Extreme of discharge.—Maximum stage recorded during year, 10.6 feet at 7 a. m., November 16 (discharge, 21,500 second-feet); minimum stage recorded, 2.05 feet June 27, 29, and 30, July 1–4, 9–16, 18–20, 28–29, and 31; August 1–3, and 6, 7 (discharge, 468 second-feet).

1911–1915: Maximum stage recorded, 13.3 feet at 6 a. m. and 7 p. m., June 10, 1914 (discharge, 32,200 second-feet); minimum stage recorded, 2.05 feet, June 27, 29, and 30, July 1–4, 9–16, 18–20, 28–29, and 31, August 1–3, and 6–7, 1915 (discharge, 468 second-feet).

Diversions.—No diversions are made from the river between this station and the one at Milner except small ranch ditches.

Regulation.—Flow past station is regulated directly by diversions of the North and South side canals at Milner, where practically the entire flow of the river is diverted during the last part of the irrigation season; flow at such times consists of inflow and seepage between this station and that at Milner.

Accuracy.—Stage-discharge relation practically permanent. Rating curve well defined. Gage read to quarter tenths twice daily. Daily discharge ascertained by applying mean daily gage heights to rating table. Records of monthly discharge excellent though parts of the records of daily discharge may be somewhat in error as a result of diurnal fluctuations due to operation of gates at Milner dam.

Discharge measurements of Snake River near Twin Falls, Idaho, during the year ending Sept. 30, 1915.

[Made by A. W. Harrington.]

Date.	Gage height.	Discharge.
	Feet.	*Sec.-ft.*
June 14	4.45	3,070
August 17	2.13	505

Daily discharge, in second-feet, of Snake River near Twin Falls, Idaho, for the year ending Sept. 30, 1915.

Day.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.
1	5,520	6,530	11,800	6,270	6,270	6,790	5,520	1,940	8,440	468	468	515
2	6,020	10,200	13,000	6,530	7,060	6,530	5,520	2,220	7,600	468	468	515
3	9,020	9,300	11,100	7,060	7,060	5,520	5,520	1,940	5,280	468	468	490
4	7,880	9,020	9,900	6,790	6,020	4,820	4,160	3,180	7,060	468	490	490
5	7,600	9,300	7,600	6,270	6,020	5,280	4,590	3,740	10,500	490	490	490
6	7,060	9,900	5,520	7,060	6,020	6,530	4,590	3,740	15,100	490	468	490
7	7,600	9,900	6,530	6,020	6,020	7,060	4,590	3,180	11,100	490	468	490
8	8,440	8,720	7,600	6,020	6,020	4,820	4,590	2,520	11,800	490	490	490
9	9,900	9,300	8,160	6,020	6,270	5,520	4,820	1,570	11,100	468	490	490
10	9,300	8,160	6,530	6,020	6,020	4,160	5,520	3,940	8,440	468	490	490
11	9,300	7,060	6,530	6,270	6,020	4,379	4,590	2,520	5,280	468	490	490
12	9,300	9,300	6,530	6,020	6,020	5,040	4,160	1,510	2,830	468	490	490
13	8,160	6,790	5,760	6,270	5,760	5,040	3,540	1,140	3,360	468	490	515
14	6,020	4,590	4,160	6,790	5,520	4,820	3,540	1,090	3,180	468	490	540
15	6,790	10,500	4,820	7,320	6,020	4,160	4,160	1,000	2,670	468	490	540
16	9,900	20,000	7,320	6,020	6,270	4,160	6,270	955	1,090	468	490	540
17	12,400	8,720	7,320	5,760	6,530	4,820	5,760	955	830	490	490	515
18	11,100	8,160	6,270	6,020	5,280	4,590	2,360	1,040	720	468	490	515
19	10,200	8,160	5,520	6,020	6,020	5,280	1,820	1,000	688	468	490	515
20	9,900	8,720	3,940	6,270	6,530	6,020	5,040	2,520	625	468	490	540
21	9,900	8,440	3,360	6,020	8,160	5,520	4,820	2,360	625	490	490	540
22	10,500	9,300	3,540	6,270	6,790	5,280	4,590	3,540	568	490	490	515
23	9,900	9,020	3,940	5,520	6,020	5,520	4,160	4,820	540	490	490	540
24	9,300	7,600	4,160	4,820	4,820	4,820	4,370	5,760	515	490	490	515
25	8,720	8,440	4,820	5,040	5,040	4,820	5,040	6,790	490	490	490	540
26	8,160	8,720	4,820	5,040	7,320	5,280	4,820	6,790	490	490	490	595
27	8,160	7,600	5,280	5,520	6,530	6,270	4,590	7,880	468	490	490	595
28	8,160	7,880	5,280	5,280	5,760	6,790	4,160	8,720	490	468	490	568
29	8,160	7,880	5,520	5,040	....	6,270	2,520	8,440	468	468	490	568
30	8,720	6,530	6,270	5,040	....	6,270	2,080	8,720	468	490	490	655
31	7,600	....	6,270	5,520	....	6,020	....	8,720	....	468	490	....

Monthly discharge of Snake River near Twin Falls, Idaho, for the year ending Sept. 30, 1915.

Month.	Discharge in second-feet.			Run-off (total in acre-feet).	Accuracy.
	Maximum.	Minimum.	Mean.		
October	12,400	5,520	8,670	533,000	A.
November	20,000	4,590	8,790	523,000	A.
December	13,000	3,360	6,420	395,000	A.
January	7,320	4,820	6,000	369,000	A.
February	8,160	4,820	6,190	344,000	A.
March	7,060	4,160	5,430	334,000	A.
April	6,270	1,820	4,390	261,000	A.
May	8,720	955	3,690	227,000	A.
June	15,100	468	4,090	243,000	A.
July	490	468	477	29,300	A.
August	490	468	486	29,900	A.
September	655	490	526	31,300	A.
The year	20,000	468	4,580	3,320,000	

SNAKE RIVER NEAR HAGERMAN, IDAHO.

Location.—In sec. 2, T. 8 S., R. 13 E., at Owsley's ferry, just above Upper Salmon Falls, and about 5 miles south of Hagerman, Gooding County. Big Wood River enters about 10 miles below.

Drainage area.—Not measured.

Records available.—August 24, 1912, to September 30, 1915.

Gage.—Vertical staff on left bank about 50 feet below the ferry; installed August 15, 1915, at same location and datum as former inclined gage. Gage No. 2 read by Clarice Owsley. An auxiliary inclined staff is also maintained at the site of a proposed power house 1¾ miles below.

Discharge measurements.—Made from cable about 150 feet above gage.

Channel and control.—Control rocky; practically permanent during year.

Winter flow.—Stage-discharge relation not affected by ice; open-water rating curves are applicable throughout winter.

Extremes of discharge.—Maximum stage recorded during year, 6.3 feet at 7.20 a. m. November 16 (discharge, 23,100 second-feet); minimum stage recorded, 3.1 feet July 15 to August 2 (discharge, 4,030 second-feet).

1912–1915: Maximum stage recorded 7.75 feet at 6 p. m., June 10, 1914 (discharge, 35,100 second-feet); minimum stage recorded, 3.1 feet July 15 to August 2, 1915 (discharge, 4,030 second-feet).

Diversions.—No diversions of importance between this station and that at Milner. Practically entire flow of the river is diverted at Milner during part of the irrigation season by the Twin Falls canals, and the flow at Owsley's ferry is maintained largely by springs and waste water from irrigation up the river.

Regulation.—Flow regulated by diversions of Twin Falls canals at Milner.

Accuracy.—Stage-discharge relation practically permanent during year. Rating curve well defined. Gage read to quarter tenths twice daily. Discharge ascertained by applying mean daily gage heights to the rating table. Records good except for a few days when gage heights are questionable.

Discharge measurements of Snake River near Hagerman, Idaho, during the year ending Sept. 30, 1915.

Date.	Made by—	Gage height.	Discharge.	Date.	Made by—	Gage height.	Discharge.
		Feet.	*Sec.-ft.*			*Feet.*	*Sec.-ft.*
Oct. 5	A. W. Harrington....	4,65	11,100	Aug. 15	A. W. Harrington....	3,23	4,530
May 30	G. C. Baldwin.......	4,69	11,800				

Daily discharge, in second-feet, of Snake River near Hagerman, Idaho, for the year ending Sept. 30, 1915.

Day.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.
1	10,700	11,900	15,800	9,540	9,540	10,700	9,000	6,060	11,900	4,410	4,030	4,600
2	10,700	11,900	12,500	9,540	10,700	10,700	9,000	6,500	12,500	4,410	4,030	4,600
3	10,700	11,900	11,900	9,540	11,300	10,700	9,000	6,500	14,400	4,410	4,220	4,600
4	10,700	11,900	11,900	9,540	10,700	9,000	9,000	7,450	15,800	4,410	4,220	4,600
5	11,300	11,900	11,900	9,540	9,000	9,000	9,000	7,950	15,800	4,410	4,220	4,600
6	10,700	11,900	10,700	9,000	9,000	9,000	9,000	7,450	17,800	4,410	4,220	4,600
7	10,700	12,500	10,700	9,000	9,000	10,700	9,000	7,450	17,100	4,410	4,220	4,600
8	10,700	11,900	10,700	9,000	9,000	7,950	9,000	7,950	14,400	4,410	4,220	4,600
9	11,900	11,300	11,300	8,460	9,000	7,950	7,950	7,950	11,900	4,410	4,220	4,600
10	10,700	11,300	11,900	8,460	9,000	9,000	7,950	7,450	10,700	4,410	4,220	4,600
11	10,700	10,100	11,300	8,460	9,000	9,000	7,950	7,950	9,540	4,220	4,220	4,600
12	11,300	11,900	11,300	9,000	9,000	9,000	7,950	7,950	7,450	4,220	4,220	4,600
13	11,300	11,900	11,300	9,000	9,000	9,000	9,000	5,620	6,500	4,220	4,320	4,600
14	11,300	10,100	11,300	9,000	9,000	9,000	9,540	5,620	6,500	4,220	4,410	4,600
15	12,500	10,100	10,700	9,540	9,000	9,000	9,540	5,620	5,620	4,030	4,600	4,600
16	13,800	22,300	10,100	10,100	9,000	9,000	9,000	5,620	5,620	4,030	4,410	4,600
17	15,800	15,100	9,540	10,100	9,000	9,000	9,000	5,620	5,210	4,030	4,410	4,600
18	16,400	12,500	9,540	9,540	9,000	7,950	9,000	6,060	5,210	4,030	4,410	4,800
19	15,100	10,700	8,460	9,540	9,000	8,460	5,620	6,060	5,210	4,030	4,410	4,800
20	13,800	10,700	8,460	9,540	9,000	9,000	5,620	6,060	4,800	4,030	4,410	4,800
21	....	10,700	8,460	9,000	11,300	9,540	5,620	6,500	4,800	4,030	4,410	4,800
22	....	11,300	9,000	9,000	10,700	10,100	5,620	7,950	4,800	4,030	4,410	4,800
23	....	11,900	9,000	9,000	11,300	9,540	6,060	7,950	4,800	4,030	4,410	4,800
24	....	11,900	9,000	9,000	11,300	9,540	6,060	9,540	4,800	4,030	4,410	4,800
25	....	11,900	9,000	9,000	10,700	9,000	5,620	10,100	4,600	4,030	4,410	4,800
26	11,300	12,500	9,000	9,540	10,700	9,000	5,620	10,700	4,410	4,030	4,600	4,800
27	11,300	12,500	9,000	9,540	10,700	9,000	5,620	10,700	4,410	4,030	4,800	4,800
28	11,300	11,900	9,000	9,540	10,700	9,000	6,060	10,700	4,410	4,030	4,800	4,800
29	11,900	11,900	9,540	9,540	....	9,000	6,060	10,700	4,410	4,030	4,600	4,800
30	11,900	16,400	9,540	9,540	....	9,000	6,060	11,900	4,600	4,030	4,600	4,800
31	11,900	....	9,540	9,540	....	9,000	....	11,900	....	4,030	4,600	....

NOTE.—Mean discharge Oct. 21-25 estimated at 13,000 second-feet from records of flow at other stations. Discharge interpolated Oct. 19 and Aug. 13.

Monthly discharge of Snake River near Hagerman, Idaho, for the year ending Sept. 30, 1915.

Month.	Discharge in second-feet.			Run-off (total in acre-feet).	Accuracy.
	Maximum.	Minimum.	Mean.		
October	16,400	10,700	12,100	744,000	B.
November	22,300	10,100	12,200	726,000	A.
December	15,800	8,460	10,400	640,000	A.
January	10,100	8,460	9,280	571,000	A.
February	11,300	9,000	9,770	543,000	A.
March	10,700	7,950	9,190	565,000	A.
April	9,540	5,620	7,620	453,000	A.
May	11,900	5,620	7,860	483,000	A.
June	17,800	4,410	8,330	496,000	A.
July	4,410	4,030	4,180	257,000	B.
August	4,800	4,030	4,380	269,000	A.
September	4,800	4,600	4,690	279,000	A.
The year	22,300	4,030	8,320	6,030,000	

SNAKE RIVER AT KING HILL, IDAHO.

Location.—In sec. 7, T. 5 S., R. 11 E., about 300 feet east of the Oregon Short Line Railroad station at King Hill, Elmore County. Big Wood River enters from the north about 20 miles above the station.

Drainage area.—Not measured.

Records available.—May 13, 1909, to September 30, 1915.

Gage.—Inclined staff on right bank installed August 17, 1910; read by P. W. McCarthy. The original gage used May 13, 1909, to March 1, 1910, was a vertical staff on the left bank at practically the same section as the present gage, but with datum about 2.2 feet higher. Temporary staff gage about three-fourths mile above present location used March 7 to August 16, 1910.

Discharge measurements.—Made from cable about 100 feet below gage.

Channel and control.—Bed at the gage and measuring section composed largely of gravel. The control is a lava reef partly overlain with gravel; shifts slightly.

Winter flow.—Stage-discharge relation unaffected by ice; open-channel ratings applicable throughout winter.

Extremes of discharge.—Maximum stage recorded during year, 11.6 feet at 2.55 p. m. November 16 (discharge, 26,300 second-feet); minimum stage recorded, 5.1 feet June 27 and 29 (discharge, 5,740 second-feet).

1909–1915: Maximum stage recorded, 13.1 feet June 12 and 13, 1909 (discharge, 41,900 second-feet); minimum stage recorded, 4.5 feet July 7–9 and August 15 and 16, 1910 (discharge, 4,760 second-feet).

Diversions.—No important diversions for irrigation are made between the Milner station and King Hill.

Regulation.—Flow regulated by diversions at Milner. During certain parts of the irrigation season practically the entire flow of the river is appropriated and the flow at King Hill is derived largely from springs and seepage water from the Twin Falls tracts.

Accuracy.—Stage-discharge relation changed slightly during the year. Rating curves well defined. Gage read to quarter tenths daily. Discharge determined by applying daily gage heights to several rating tables during year. Records good.

Discharge measurements of Snake River at King Hill, Idaho, during the year ending Sept. 30, 1915.

Date.	Made by—	Gage height.	Discharge.
		Feet.	*Sec.-ft.*
Apr. 18	G. C. Baldwin	6.75	9,190
Aug. 13	A. W. Harrington	5.27	6,250

Daily discharge, in second-feet, of Snake River at King Hill, Idaho, for the year ending Sept. 30, 1915.

Day.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.
1	12,100	13,700	16,400	11,800	11,800	12,100	11,300	8,070	13,200	5,950	6,460	6,280
2	13.100	13,400	19,400	11,800	12.400	12,400	11,000	9,100	12,900	5,950	6,460	6,280
3	15,000	13,700	17,500	11,800	12,400	12,100	10,700	9,370	12,600	5,950	6.260	6,280
4	14,700	14,300	15,300	12,100	11,800	11,600	10,400	8,070	11,400	5,970	6,260	6,280
5	13,700	14,300	14,300	11,800	11,800	11,000	10,400	9,370	14,500	5,970	6,260	6,280
6	13,100	15,000	13,100	11,800	11,800	11,000	10,100	9,910	16,600	6,180	6,260	6,280
7	13,100	14,300	11,300	11,600	11,600	12,800	9,590	9,370	17,000	6,390	6,260	6,280
8	14,000	14,000	13,100	11,600	11,800	10,700	9,590	9,100	16,200	6,390	6,260	....
9	14,700	14,300	13,700	11,600	11,800	10,700	9,590	9,130	15,900	6,610	6,260	....
10	14,700	12,800	13,400	11,600	11,800	10,100	10,100	9,400	15,900	6,610	6,280	....
11	14,300	12.100	12,100	11,800	11,800	10,400	10,100	9,130	13,900	6,390	6,280	....
12	14,000	13,700	12,100	11,800	11,600	10,400	9,860	9,130	12,400	6,410	6,280	....
13	13,400	12,400	11,300	11,800	11,600	10,100	9,860	8,610	12,000	6,200	6,280	....
14	13,100	10,400	10,100	11,800	11,800	10,100	9,050	7,600	13,000	6,200	6,280	....
15	12,100	10,400	9,860	11,800	11,800	10,100	9,050	6,900	13,300	6,200	6,280	....
16	12,800	26,300	11,600	11,800	11,800	10,100	10,[illegible]00	6,900	10,600	6,200	6,280	....
17	17,800	17,800	11,600	11,800	12,400	10,400	10,700	6,700	6,760	5,990	6,280	....
18	17,100	14,000	12,100	11,600	11,000	10,400	9,590	6,260	6,570	6,200	6,280	....
19	16,400	13,700	11,800	11,600	11,800	10,400	6,180	7,150	6,350	6,200	6,280	....
20	15,600	13,700	10,100	11,800	11,800	10,700	6,390	7,630	6,350	6,220	6,280	....
21	15,000	13,700	9,320	11,600	12,100	10,700	9,590	8,120	6,140	6,430	6,280	....
22	16,400	14,000	9,320	11,600	13,100	10,700	9,860	8,630	6,140	6,220	6,280	....
23	15,300	15,000	9,050	11,600	12,400	10,700	9,620	9,430	6,140	6,220	6,280	....
24	14,700	14,000	9,050	11,300	10,700	10,400	9,620	11,100	5,930	6,220	6,280	....
25	14,700	13,700	9,860	11,000	11,000	10,100	9,620	11,400	6,140	6,220	6,280	....
26	14,300	13,700	10,700	10,700	11,600	10,700	10,200	12,600	6,160	6,220	6,280	....
27	14,000	13,100	10,700	10,700	12,100	11,800	10,400	12,600	5,740	6,460	6,280	....
28	14,300	13,100	10,700	10,700	12,100	12,100	9,620	13,200	5,950	6,460	6,280	....
29	15,000	13,400	10,700	10,700	....	11,800	9,350	13,800	5,740	6,240	6,280	....
30	14,300	16,000	11,000	10,700	....	11,800	8,820	13,500	5,950	6,460	6,280	....
31	14,300	....	11,000	11,000	....	11,800	....	13,200	....	6,460	6,280	....

NOTE.—Discharge determined as follows: Oct. 1 to Apr. 18 from a well-defined rating curve; Apr. 19 to Aug. 12, by shifting-control method; Aug. 13 to Sept. 8, from a well-defined curve. Gage not read Sept. 8–30; mean discharge estimated at 6,500 second-feet.

Monthly discharge of Snake River at King Hill, Idaho, for the year ending Sept. 30, 1915.

Month.	Discharge in second-feet.			Run-off (total in acre-feet).	Accuracy.
	Maximum.	Minimum.	Mean.		
October	17,800	12,100	14,400	885,000	A.
November	26,300	10,400	14,100	839,000	A.
December	19,400	9,050	12,000	738,000	A.
January	12,100	10,700	11,500	707,000	A
February	13,100	10,700	11,800	655,000	A
March	12,800	10,100	11,000	676,000	A.
April	11,300	6,180	9,680	576,000	A.
May	13,800	6,260	9,500	584,000	B.
June	17,000	5,740	10,200	607,000	B.
July	6,610	5,950	6,250	384,000	B.
August	6,460	6,260	6,290	387,000	A.
September	....	6,280	6,450	384,000	B.
The year	26,300	5,740	10,300	7,420,000	

SNAKE RIVER NEAR MURPHY, IDAHO.

Location.—In the NW. ¼ sec. 18, T. 2 S., R. 1 E., three-fourths mile below the Swan Falls power plant, 1½ miles below the company ferry and 12 miles east of Murphy. The gage is on the Ada County side of the river and is 38 miles below the mouth of Bruneau River.

Drainage area.—41,900 square miles (measured on United States Land Office maps).

Records available.—August 21, 1913, to September 30, 1915.

Gage.—Friez water-stage recorder on right bank one-fourth mile below house of S. H. Cantwell; installed September 7, 1914. Temporary vertical staff first installed at this site August 29, 1912, was replaced October 2, 1912, by an inclined staff, and a vertical low-stage section was added August 22, 1913. Temporarily installed water-stage recorders were in operation December 13, 1913, to June 27, 1914. All gages at practically the same location and set to the same datum. Records prior to August 21, 1913, fragmentary.

Discharge measurements.—Made from ferryboat 1½ miles above the gage.

Channel and control.—Bed composed of lava rock overlain with deposits of sand, silt, and gravel, where not scoured out by the current. Control practically permanent; banks not subject to overflow.

Winter flow.—Stage-discharge relation not affected by ice.

Extremes of discharge.—Maximum stage during year, from water-stage recorder, 8.52 feet at 2 p. m. November 17, 1914 (discharge 25,600 second-feet); minimum stage not definitely determined but less than —1.45 feet on several occasions during manipulation of gates at the power plant. Minimum mean daily stage, —1.2 feet July 17 and 23 (discharge 5,560 second-feet).

1912–1915: Maximum stage recorded 12.13 feet at 11.30 a. m. June 10, 1914 (discharge 39,600 second-feet); minimum stage as noted for current year.

Diversions.—A number of small pumping plants divert water for irrigation between this station and that at King Hill.

Regulation.—Large diurnal fluctuations in stage are due to the manipulation of the gates at the dam above and to variation in load at the power plant, but because of the small amount of storage obtained at the dam the changes are of short duration.

Accuracy.—Stage-discharge relation constant during year. Rating curve well defined. Operation of water-stage recorder satisfactory except as noted in footnote to table of daily discharge. Daily discharge determined by applying to rating table mean daily gage heights obtained by inspection of recorder graph. Records good.

Cooperation.—Gage-height record furnished by Electric Investment Co., formerly the Idaho Railway Light & Power Co.

The following discharge measurement was made by A. W. Harrington:

May 10, 1915: Gage height, 1.70 feet; discharge, 8,780 second-feet.

Daily discharge, in second-feet, of Snake River near Murphy, Idaho, for the year ending Sept. 30, 1915.

Day.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.
1	12,200	14,800	13,800	12,400	11,400	11,800	....	8,420	15,300	5,980	6,130	5,840
2	11,600	13,100	13,600	12,400	12,000	12,400	....	8,280	15,000	5,980	6,050	5,980
3	12,000	13,800	19,200	12,200	13,100	12,900	....	8,140	14,800	5,980	6,050	5,910
4	14,000	16,300	17,900	12,900	13,300	12,400	....	8,870	14,300	6,050	6,050	5,980
5	14,500	15,300	16,500	12,900	12,400	10,800	....	8,720	12,600	6,130	6,050	5,910
6	14,300	15,000	14,500	12,400	12,000	11,000	....	9,690	....	5,980	5,980	5,910
7	13,800	15,500	13,100	12,900	11,800	11,400	10,800	10,200	....	6,290	6,050	5,840
8	13,600	15,500	12,200	12,200	12,000	13,300	10,200	9,860	19,000	5,770	6,050	5,910
9	14,300	15,000	13,300	12,000	12,000	11,600	10,200	9,520	17,300	6,050	6,050	5,910
10	15,300	15,000	14,000	12,200	12,000	11,400	10,200	8,570	16,800	6,050	5,980	5,910
11	15,500	14,800	14,500	12,000	12,200	10,800	10,400	8,420	16,500	6,130	5,980	5,910
12	15,300	11,800	12,200	12,000	12,200	10,200	10,800	9,520	13,800	5,840	5,910	5,840
13	15,300	14,300	12,900	12,000	12,000	10,600	10,400	9,350	11,400	5,910	5,840	5,980
14	15,000	14,800	12,400	12,000	12,200	11,600	9,690	8,000	9,350	5,910	5,980	5,980
15	13,800	11,600	11,300	12,400	11,600	11,000	9,350	7,870	10,000	5,630	5,910	5,980
16	12,400	11,800	10,200	13,300	11,400	10,000	9,190	7,870	9,350	6,050	5,980	6,050
17	14,300	23,800	11,800	12,600	12,000	10,400	10,200	7,610	8,140	5,560	6,050	6,050
18	18,700	19,000	12,900	11,800	12,900	10,400	11,200	7,480	7,000	5,840	5,980	6,050
19	17,600	14,800	12,600	11,600	11,800	11,000	10,200	7,610	6,890	6,210	5,910	6,130
20	16,800	14,300	11,700	11,800	11,600	10,000	8,000	8,000	6,570	5,910	5,980	6,050
21	16,300	14,800	10,800	12,000	12,000	11,400	8,420	8,420	6,470	5,910	5,840	6,290
22	16,000	14,500	9,860	12,200	13,800	11,600	10,000	9,520	6,380	5,630	5,840	6,290
23	17,100	15,300	9,350	12,000	13,300	11,600	10,200	9,520	6,380	5,560	5,910	6,130
24	16,800	15,000	9,350	11,800	12,900	11,400	10,000	....	6,290	5,840	5,910	6,050
25	16,300	14,800	9,520	11,000	11,600	11,400	9,690	....	6,130	5,980	5,980	6,130
26	16,000	13,600	10,200	10,800	11,200	11,000	10,400	....	6,210	5,840	5,910	6,130
27	15,500	15,300	10,600	11,000	12,600	11,000	10,400	....	6,210	5,980	5,840	6,290
28	15,000	14,000	11,000	11,200	13,100	....	10,400	....	6,210	5,840	5,910	6,380
29	15,000	13,800	11,200	11,100	....	....	9,860	15,000	6,050	5,980	5,770	6,470
30	15,000	14,000	11,400	11,000	....	....	9,190	15,300	6,050	5,840	5,840	6,380
31	15,000	....	12,000	11,000	....	....	....	15,300	....	6,050	5,840	....

NOTE.—No gage height record obtained Dec. 15, 20, Jan. 29, Mar. 28 to Apr. 6, May 24–28, and June 6 and 7; discharge estimated. Mean discharge estimated as follows: Mar. 28–31, 12,300 second-feet; Apr. 1–6, 11,800 second-feet; May 24–28, 12,300 second-feet; June 7 and 8, 17,000 second-feet. During parts of certain days in July, Aug., and Sept., stage fell below range of recorder, owing to manipulation of gates at power house, but this fluctuation affected accuracy of daily discharge record but slightly.

Monthly discharge of Snake River near Murphy, Idaho, for the year ending Sept. 30, 1915.

Month.	Discharge in second-feet.			Run-off (total in acre-feet).	Accuracy.
	Maximum.	Minimum.	Mean.		
October	18,700	11,600	15,000	922,000	A.
November	23,800	11,600	14,800	881,000	A.
December	19,200	9,350	12,400	762,000	A.
January	13,300	10,800	12,000	738,000	A.
February	13,800	11,200	12,200	678,000	A.
March	13,300	10,000	11,400	701,000	A.
April	....	8,000	10,300	613,000	B.
May	15,300	7,480	9,890	608,000	B.
June	19,000	6,050	10,700	637,000	A.
July	6,290	5,560	5,930	365,000	B.
August	6,130	5,770	5,950	366,000	A.
September	6,470	5,840	6,060	361,000	A.
The year	23,800	5,560	10,500	7,630,000	

NOTE.—See footnote to table of daily discharge.

SNAKE RIVER AT WEISER, IDAHO.

Location.—In sec. 31, T. 11 N., R. 5 W., about one-third of a mile above wagon bridge at Weiser, Washington County. Between this station and that near Murphy, Succor Creek and Owyhee and Malheur rivers enter Snake River on the left bank and Boise, Payette, and Weiser rivers on the right bank.

Drainage area.—Not measured.

Records available.—October 8, 1910, to September 30, 1915. Fragmentary record of gage heights obtained by Weather Bureau since 1895.

Gage.—Inclined concrete gage on right bank installed by Weather Bureau; read by J. W. Lapish. Gage used October 8, 1910, to September 30, 1914, was an inclined staff on right bank about 200 yards below wagon bridge at different datum.

Discharge measurements.—Made from cable about 200 yards below bridge.

Channel and control.—Bed composed of rocks and coarse gravel. Control fairly permanent. One channel at all stages.

Winter flow.—Stage-discharge relation not seriously affected by ice; open channel rating curve used throughout the year.

Extremes of discharge.—Maximum stage recorded during year, 6.4 feet at 8 a. m., November 18 (discharge 28,600 second-feet); minimum stage, 1.5 feet at 8 a. m., August 28 and 29 (discharge 5,550 second-feet).

1910–1915: Maximum stage recorded, 14.5 feet (U. S. G. S. gage datum) June 15, 1912 (discharge 73,800 second-feet); minimum stage, 1.5 feet Weather Bureau datum) at 8 a. m. August 28 and 29, 1915 (discharge 5,550 second-feet).

Diversions.—Some water diverted between Weiser and station near Murphy but almost entirely by pumping.

Accuracy.—Stage-discharge relation constant during year. Rating curve well defined. Gage read to tenths once daily. Daily discharge determined by applying daily gage heights to rating table. Records good.

Cooperation.—Gage height record furnished by United States Weather Bureau.

Discharge measurements of Snake River at Weiser, Idaho, during the year ending Sept. 30, 1915.

[Made by A. W. Harrington.]

Date.	Gage height.	Discharge.	Date.	Gage height.	Discharge.
	Feet.	*Sec.-ft.*		*Feet.*	*Sec.-ft.*
Apr. 25	4.17	15,600	Sept. 3	1.66	6,170
July 12	2.38	8,640			

Note.—Gage heights refer to United States Weather Bureau gage. United States Geological Survey gage read as follows: Apr. 25, 7 feet; July 12, 5.54 feet; Sept. 3, 4.84 feet.

Daily discharge, in second-feet, of Snake River at Weiser, Idaho, for the year ending Sept. 30, 1915.

Day.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.
1	12,800	18,500	17,400	14,100	14,100	17,000	22,400	17,000	26,700	7,470	6,490	5,860
2	13,300	18,000	18,500	14,100	16,500	17,000	20,700	16,500	26,700	7,470	6,810	6,170
3	13,700	17,400	19,000	14,600	18,500	16,000	19,600	15,500	26,100	7,470	6,810	6,170
4	13,700	16,500	23,000	14,600	16,500	16,000	19,600	15,000	24,800	7,140	6,490	6,170
5	15,000	21,200	22,400	14,600	18,000	16,500	19,600	14,600	23,600	7,140	6,490	6,170
6	17,400	19,000	21,200	15,000	16,500	15,000	19.000	14,100	21,200	7,470	6,490	6,490
7	17,000	19,000	20,100	15,000	15,000	14,100	18,500	14,100	21,200	7,470	6,490	6,170
8	19,000	19,000	17,400	15,000	15,000	14,600	17,400	14,600	23,000	7,810	6,490	6,170
9	16,500	20,100	15,000	15,000	15,000	16,500	17,000	14,600	26,100	8,510	6,170	6,170
10	17,000	19,000	15,500	15,000	15,500	15,000	16,000	15,000	22,400	7,470	6,170	6,170
11	19,000	19,000	16,000	14,600	15,500	14,100	16,000	15,500	21,800	8,870	6,170	6,170
12	18,500	19,000	17,000	14,600	16,000	14,600	16,000	16,500	21,200	8,510	5,860	6,170
13	18,500	15,000	16,000	14,600	15,500	13,700	17,000	19,000	18,500	7,470	5,860	6,490
14	18,500	15,000	15,500	14,600	15,000	14,600	17,400	21,800	16,500	7,470	5,860	6,490
15	18,500	15,500	15,000	14,100	15,000	15,500	17,400	19,000	13,700	6,810	5,860	6,490
16	17,400	17,400	14,100	14,100	14,600	15,500	16,500	18,500	13,300	7,470	5,860	6,810
17	15,500	20,100	12,800	14,100	14,600	15,500	16,000	18,000	12,800	7,140	5,860	6,810
18	17,400	28,600	12,800	14,100	15,000	15,000	15,500	22,400	11,600	7,140	5,860	6,810
19	23,000	23,600	12,800	13,700	18,000	15,000	15,500	26,700	10,800	6,810	5,860	6,810
20	23,000	23,600	12,400	13,700	18,000	15,000	17,400	25,400	9,990	7,140	5,860	6,810
21	22,400	23,000	12,800	13,700	17,400	15,500	15,500	23,600	9,610	7,140	5,860	6,810
22	21,800	22,400	13,300	13,700	17,400	16,500	15,000	23,600	9,240	6,490	6,170	6,810
23	21,800	20,100	13,300	14,100	17,400	16,500	16,500	23,600	8,870	6,490	5,860	6,810
24	22,400	17,400	13,700	14,100	18,000	17,000	16,500	23,600	8,510	5,860	5,860	6,810
25	21,800	17,400	18,700	14,100	17,400	18,000	16,000	25,400	8,160	6,170	5,860	6,810
26	21,200	17,400	14,100	14,600	16,500	19,000	15,500	26,100	8,160	6,490	5,860	6,810
27	20,700	18,000	14,600	14,600	15,500	19,000	15,000	25,400	8,510	6,490	5,860	6,810
28	20,100	18,000	15,000	14,100	16,000	18,000	15,500	25,400	8,510	6,490	5,550	6,810
29	19,600	18,000	14,600	13,700	....	18,500	16,000	26,700	8,510	6,490	5,550	7,140
30	19,000	17,400	14,100	13,700	....	20,700	16,500	26,700	7,810	6,490	5,860	7,140
31	19,000	....	14,100	13,700	....	21,800	....	26,700	....	6,490	5,860	....

Monthly discharge of Snake River at Weiser, Idaho, for the year ending Sept. 30, 1915.

Month.	Discharge in second-feet.			Run-off (total in acre-feet).	Accuracy.
	Maximum.	Minimum.	Mean.		
October	23,000	12,800	18,500	1,140,000	A.
November	28,600	15,000	19,100	1,140,000	A.
December	23,000	12,400	15,700	965,000	A.
January	15,000	13,700	14,300	879,000	A.
February	18,500	14,100	16,200	900,000	A.
March	21,800	13,700	16,300	1,000,000	A.
April	22,400	15,000	17,100	1,020,000	A.
May	26,700	14,100	20,300	1,250,000	A.
June	26,700	7,810	15,900	946,000	A.
July	8,870	5,860	7,140	439,000	A.
August	6,810	5,550	6,060	373,000	A.
September	7,140	5,860	6,540	389,000	A.
The year	28,600	5,550	14,400	10,400,000	

SNAKE RIVER NEAR BURBANK, WASH.

Location.—In sec. 28, T. 9 N., R. 31 E., at the head of Fivemile Rapids, above intake of Burbank Power & Water Co.'s canal, 4 miles above Burbank, in Walla Walla County.

Drainage area.—109,000 square miles (measured on General Land Office and Forest Service maps).

Records available.—September 1, 1909, to September 30, 1915; fragmentary records October 2, 1907, to August 31, 1909.

Gage.—Inclined staff 1,500 feet above canal intake; datum 300 feet above sea level; auxiliary vertical staff at lower end of power canal. Gage read daily by Harry Phelps, Lewis Dunlap, and E. B. Madden.

Discharge measurements.—Made from Northern Pacific Railway bridge at Burbank, 4 miles below gage.

Channel and control.—Control at head of rapids; may shift at flood stages.

Extremes of discharge.—Maximum stage recorded during year, 42.6 feet May 20 and 21 (discharge, 122,000 second-feet); minimum stage recorded, 34.6 feet September 1 and 2 (discharge, 13,000 second-feet).

1909–1915: Maximum stage recorded, 51.8 feet May 29, 1913 (discharge, 298,000 second-feet, revised); minimum stage recorded, 34.6 feet September 4, 1914 (discharge, 13,000 second-feet, revised).

Winter flow.—Stage-discharge relation not affected by ice.

Diversions.—A large amount of water is diverted from Snake River for irrigation in southern Idaho.

Storage.—Jackson Lake reservoir (capacity, 400,000 acre-feet) is the largest in operation.

Accuracy.—Stage-discharge relation practically permanent during the year; not affected by ice. Rating curve well defined below 225,000 second-feet. Gage read to tenths once daily. Daily discharge ascertained by applying daily gage heights to rating table. Records excellent for periods in which regular gage was read, good for those in which readings were obtained from gage in power canal, and fair when based partly on hydrographic comparison with records of flow at Lewiston and Riparia. See footnote to table of daily discharge.

Cooperation.—Gage-height record furnished by the Burbank Co.

Discharge measurements of Snake River near Burbank, Wash., during the year ending Sept. 30, 1915.

Date.	Made by—	Gage height.	Discharge.	Date.	Made by—	Gage height.	Discharge.
		Feet.	*Sec.-ft.*			*Feet.*	*Sec.-ft.*
Oct. 31	C. O. Brown	37.62	30,700	Sept. 23	C. O. Brown	34.96	14.500
Feb. 1	James E. Stewart	36.52	23,500	24	do	34.94	14,600

Daily discharge, in second-feet, of Snake River near Burbank, Wash., for the year ending Sept. 30, 1915.

Day.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.
1	24,600	33,000	29,400	26,100	23,200	30,200	49,600	62,200	94,100	37,200	21,900	13,000
2	22,900	34,000	28,500	28,500	....	29,400	52,300	62,200	94,100	36,100	21,900	13,000
3	21,200	36,100	27,700	....	....	32,100	52,300	57,900	99,400	34,000	21,900	13,100
4	22,500	36,100	26,900	....	....	32,100	53,700	55,100	94,100	32,100	21,900	13,300
5	24,600	43,000	26,900	....	31,100	32,100	65,100	49,600	87,300	30,200	21,900	13,400
6	25,400	39,400	26,900	....	....	33,000	62,200	46,900	82,300	30,200	20,600	14,800
7	26,100	38,300	32,100	....	....	33,000	57,900	46,900	79,000	32,100	18,800	14,800
8	33,000	37,200	31,100	....	....	34,000	56,500	45,600	74,200	32,100	18,300	14,300
9	30,200	38,300	28,500	25,400	....	32,100	53,700	44,300	72,700	34,000	17,800	13,400
10	28,500	34,000	....	....	....	26,100	52,300	48,200	72,700	38,300	17,800	13,400
11	27,700	33,000	....	....	....	27,700	48,200	48,200	72,700	41,800	17,200	13,400
12	26,100	32,100	....	25,400	28,500	30,200	43,000	53,700	68,100	39,400	17,200	13,800
13	28,500	34,000	....	....	....	27,700	44,300	55,100	72,700	35,000	17,200	14,200
14	30,200	40,600	23,200	24,600	....	28,500	51,000	57,200	71,200	35,000	16,700	14,600
15	31,100	43,000	....	....	....	27,700	62,200	59,300	68,100	33,000	16,700	14,900
16	30,200	38,300	....	....	....	29,400	56,500	68,100	66,600	31,100	16,700	15,300
17	30,200	37,200	....	....	....	36,100	56,500	65,100	53,700	31,100	16,200	15,700
18	30,200	36,100	....	23,900	....	36,100	55,100	60,800	66,600	30,200	15,200	15,700
19	28,500	33,200	21,200	....	23,900	36,100	59,300	75,800	62,200	32,100	15,200	15,500
20	28,500	30,200	....	22,500	....	35,000	62,200	122,000	46,900	32,100	14,800	15,400
21	34,000	43,000	....	....	....	34,000	68,100	122,000	45,600	28,500	14,800	15,200
22	44,300	33,000	....	....	33,000	35,000	71,200	115,000	49,600	26,900	14,800	14,800
23	37,200	30,200	18,800	19,400	30,200	36,100	68,100	101,000	46,900	25,400	14,800	14,800
24	37,200	27,700	....	....	31,100	36,100	62,200	101,000	43,000	24,600	14,800	14,300
25	37,200	28,500	....	....	30,200	40,600	59,300	92,400	40,600	23,200	14,800	14,300
26	38,300	28,100	20,600	....	32,100	46,900	56,500	94,100	40,600	23,200	14,800	14,300
27	36,100	27,700	....	....	31,100	43,000	52,300	94,100	41,800	22,500	13,400	13,400
28	36,100	27,700	18,300	....	30,600	40,600	53,700	94,100	44,300	21,200	13,400	14,300
29	35,000	27,700	....	....	....	41,800	53,700	97,600	41,800	21,200	13,400	14,800
30	33,000	28,600	....	22,500	....	45,000	56,500	106,000	39,400	21,900	13,400	16,700
31	32,100	....	23,900	....	....	48,200	....	101,000	....	21,900	13,400	....

NOTE.—Determinations of discharge Oct. 5, 7–10, 12–17, 19–21, 23–26, 28–30, Nov. 1–4, 6–9, 11–17, Feb. 22–26, Mar. 1–9, 11–21, and June 16–21 based on gage heights obtained by adjusting canal-gage readings, as river gage was not read; variation between readings on canal and river gages is small. Discharge Dec. 10 to Feb. 21 estimated as follows from approximate gage heights obtained for days on which gage was not read from gage-height graph of Lewiston, Riparia, and Burbank stations: Dec. 10–13, 24,700 second-feet; Dec. 15–18, 22,400 second-feet; Dec. 20–22, 18,800 second-feet; Dec. 24–25, 19,100 second-feet; Dec. 27, 19,400 second-feet; Dec. 29–30, 19,800 second-feet; Jan. 3–8, 26,900 second-feet; Jan. 10–11, 25,400 second-feet; Jan. 13, 24,600 second-feet; Jan. 15–17, 24,100 second-feet; Jan. 19, 23,200 second-feet; Jan. 21–22, 21,900 second-feet; Jan. 24–29, 19,700 second-feet; Jan. 31, 22,500 second-feet; Feb. 2–4, 27,000 second-feet; Feb. 6–11, 30,300 second-feet; Feb. 13–18, 26,800 second-feet; and Feb. 20–21, 23,900 second-feet. Gage not read; discharge interpolated, Oct. 2; Nov. 19, 26, 28, 30; Mar. 30; May 14; Sept. 3, 4, 12–16, 19, 20, and 25.

Monthly discharge of Snake River near Burbank, Wash., for the year ending Sept. 30, 1915.

Month.	Discharge in second-feet.			Run-off (total in acre-feet).	Accuracy.
	Maximum.	Minimum.	Mean.		
October	44,300	21,200	30,700	1,890,000	B.
November	43,000	27,700	34,300	2,040,000	B.
December	32,100	....	23,400	1,440,000	B.
January	28,500	....	23,700	1,460,000	C.
February	33,000	23,200	28,400	1,580,000	C.
March	48,200	26,100	34,700	2,130,000	B.
April	71,200	43,000	56,500	3,360,000	A.
May	122,000	44,300	74,300	4,570,000	A.
June	99,400	39,400	64,400	3,830,000	A.
July	41,800	21,200	30,200	1,860,000	A.
August	21,900	13,400	16,800	1,030,000	A.
September	16,700	13,000	14,400	857,000	B.
The year	122,000	13,000	36,000	26,000,000	

TRIBUTARY BASINS.

HENRYS FORK AT WARM RIVER, IDAHO.

Location.—In sec. 12, T. 9 N., R. 43 E., Fremont County, about 300 yards above mouth of Warm River and half a mile above Warm River station on the Yellowstone branch of the Oregon Short Line Railroad; above all main tributaries.

Drainage area.—Not measured.

Records available.—September 3, 1910, to March 22, 1915, when station was discontinued.

Gage.—Vertical staff on left bank; read by Mrs. Josephine Stone.

Discharge measurement.—Made from cable at gage.

Channel and control.—Bed composed of cobbles, gravel, and sand. Stage-discharge relation at times affected by growth of moss in channel; conditions otherwise reasonably permanent.

Winter flow.—Mush ice reported in channel at various times for short periods; stage-discharge relation not seriously affected; open-channel rating curve used.

Extremes of discharge.—Maximum stage recorded October to March, 4.9 feet October 3, 4, and 6 (discharge, 1,220 second-feet); minimum stage recorded, 4.2 feet January 5 and 16 (discharge, 825 second-feet).

1910–1915: Maximum stage recorded, 7.4 feet May 21, 1912 (discharge, 3,300 second-feet); minimum stage recorded, 4.1 feet March 14 and 26, 1913 (discharge, 705 second-feet).

Diversions.—Practically none above station.

Regulation.—None.

Accuracy.—Records good except for December and January when stage-discharge relation may have been slightly affected by ice.

The following discharge measurement was made by G. C. Baldwin:
March 22, 1915: Gage height, 4.47 feet; discharge, 970 second-feet.

Daily discharge, in second-feet, of Henrys Fork at Warm River, Idaho, for the year ending Sept. 30, 1915.

Day.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Day.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.
1	1,100	1,100	935	935	1,000	935	16	1,160	1,080	880	825	990	....
2	1,160	1,100	988	935	990	935	17	1,160	1,060	898	896	990	....
3	1,220	1,100	1,040	935	990	935	18	1,160	1,040	916	968	990	....
4	1,220	1,100	1,040	880	990	935	19	1,160	1,040	935	1,040	990	....
5	1,220	1,100	1,040	825	990	935	20	1,160	1,040	935	1,020	990	....
6	1,220	1,100	1,040	852	990	935	21	1,160	1,040	935	990	935	....
7	1,160	1,100	988	880	990	935	22	1,160	1,040	935	990	935	970
8	1,160	1,100	935	908	990	935	23	1,160	1,040	935	990	935	....
9	1,160	1,100	922	935	990	935	24	1,160	1,040	935	962	935	....
10	1,160	1,100	908	935	962	935	25	1,160	1,040	935	935	935	....
11	1,160	1,100	894	935	935	935	26	1,160	1,040	935	954	935	....
12	1,160	1,100	880	935	962	935	27	1,160	1,040	935	972	935	....
13	1,160	1,100	880	907	990	935	28	1,160	1,040	935	990	935	....
14	1,160	1,100	880	880	990	....	29	1,130	1,000	935	1,020	....	....
15	1,160	1,100	880	852	990	....	30	1,100	970	935	1,040	....	....
							31	1,100	....	935	1,020	....	....

Note.—Gage read four times a week; discharge interpolated for other days. Rating curve well defined. Mean discharge Mar. 14–21 estimated at 950 second-feet.

Monthly discharge of Henrys Fork at Warm River, Idaho, for the year ending Sept. 30, 1915.

Month.	Discharge in second-feet.			Run-off (total in acre-feet).	Accuracy.
	Maximum.	Minimum.	Mean.		
October	1,220	1,100	1,160	71,300	B.
November	1,100	970	1,070	63,700	B.
December	1,040	880	939	57,700	C.
January	1,040	825	940	57,800	C.
February	1,600	935	971	53,900	B.
March 1-22	970	935	942	41,100	B.
The period				346,000	

HENRYS FORK NEAR REXBURG, IDAHO.

Location.—In sec. 30, T. 6 N., R. 39 E., Madison County, just below highway bridge about a mile below mouth of south channel of Teton River, 7 miles below main channel of Teton River, and 7 miles due west of Rexburg; below all tributaries.

Drainage area.—Not measured.

Records available.—April 13, 1909, to September 30, 1915.

Gage.—Friez water-stage recorder on right bank about 250 feet below bridge; prior to April 5, 1913, vertical staff on right bank about 25 feet farther downstream. Datum of gages used before January 1, 1912, 0.67 foot higher than that of present gage. F. P. Hansen, observer.

Discharge measurements.—Made from cable about one-fourth mile below gage, from highway bridge above gage, or by wading.

Channel and control.—Bed composed of mud, sand, and fine gravel; shifting. Except at the bridge left bank is overflowed at high stages.

Extremes of discharge.—Maximum stage recorded, 8.90 feet at 7 a. m. June 4 (discharge, 6,200 second-feet); minimum stage, 1.90 feet at 6 p. m. August 10 (discharge, 481 second-feet).

1909–1915: Maximum stage recorded, 8.7 feet (equal to 9.37 feet present datum) June 6 and 7, 1909 (discharge, 7,680 second-feet); minimum stage recorded, August 10, 1915.

Winter flow.—Stage-discharge relation seriously affected by ice; observations discontinued during winter.

Diversions.—Irrigation canals divert water above station but definite information as to number of canals and quantity of water diverted is not available.

Regulation.—None except that due to opening or closing head gates of irrigation canals.

Accuracy.—Stage-discharge relation not permanent. Rating curve well defined October 1 to June 4 (except during winter) and September 10–30. Mean daily gage heights obtained by inspecting gage-height graph. Daily discharge ascertained by applying mean daily gage heights to rating table except June 5 to September 9, for which period shifting-control method was used. Records good.

Discharge measurements of Henrys Fork near Rexburg, Idaho, during the year ending Sept. 30, 1915.

Date.	Made by—	Gage height.	Discharge.	Date.	Made by—	Gage height.	Discharge.
		Feet.	*Sec.-ft.*			*Feet.*	*Sec.-ft.*
Mar. 21	G. C. Baldwin	3.79	1,650	July 30	G. C. Baldwin	2.36	684
May 31	A. W. Harrington	6.59	4,000	Aug. 16	do	2.11	549
July 7	G. C. Baldwin	2.49	653	Sept. 10	A. W. Harrington	3.12	1,190
17	do	2.37	615				

Daily discharge, in second-feet, of Henrys Fork near Rexburg, Idaho, for the year ending Sept. 30, 1915.

Day.	Oct.	Nov.	Dec.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.
1	2,510	2,670	2,180	....	1,510	2,340	4,100	810	702	845
2	2,510	2,670	2,260	....	1,450	2,420	4,950	752	762	880
3	2,760	2,670	2,420	....	1,580	2,420	5,910	734	769	961
4	3,020	2,590	2,420	....	1,950	2,180	6,200	675	734	967
5	3,020	2,590	2,420	....	2,340	1,950	6,100	650	720	1,120
6	3,020	2,590	2,260	....	2,340	1,800	5,690	645	702	1,100
7	3,020	2,510	2,260	....	2,030	1,650	5,100	658	680	1,130
8	3,020	2,510	2,180	....	2,260	1,410	4,510	706	600	1,170
9	2,930	2,510	2,100	....	2,340	1,250	3,940	729	560	1,200
10	2,840	2,510	....	....	2,510	1,190	3,750	825	518	1,180
11	2,840	2,510	....	....	2,590	1,190	3,560	1,040	556	1,210
12	2,930	2,510	....	....	2,590	1,280	3,270	1,070	552	1,300
13	2,840	2,510	....	....	2,420	1,730	3,000	961	552	1,300
14	2,760	2,510	....	....	2,670	1,910	2,650	856	549	1,340
15	2,760	2,420	....	....	2,760	2,340	2,310	781	549	1,300
16	2,840	2,420	....	....	2,930	2,420	1,790	711	545	1,300
17	2,840	2,340	....	....	3,100	2,180	1,600	616	549	1,340
18	2,840	2,420	....	....	2,930	2,180	1,490	572	552	1,340
19	3,100	2,420	....	....	2,930	2,670	1,560	552	580	1,340
20	3,280	2,420	....	....	2,930	3,100	1,580	541	629	1,370
21	3,190	2,420	....	1,650	2,930	3,550	1,570	536	830	1,370
22	3,100	2,340	....	1,650	3,020	3,920	1,390	580	913	1,370
23	3,020	2,340	....	1,580	3,100	4,190	1,290	526	1,060	1,370
24	2,930	2,340	....	1,650	3,020	4,190	1,220	522	1,130	1,370
25	2,840	2,420	....	1,650	2,760	4,190	1,210	537	1,160	1,370
26	2,760	2,420	....	1,650	2,510	4,380	1,230	711	1,170	1,470
27	2,760	2,420	....	1,450	2,260	4,660	1,170	729	1,120	1,680
28	2,760	2,340	....	1,450	2,100	4,570	1,070	637	1,180	1,860
29	2,760	2,420	....	1,450	1,950	4,290	978	658	934	1,780
30	2,670	2,420	....	1,650	2,060	4,100	866	684	940	1,750
31	2,670	....	....	1,580	....	4,010	....	702	840	....

NOTE.—Mean discharge Dec. 10-12 estimated at 2,100 second-feet. No records obtained Dec. 13 to Mar. 20.

Monthly discharge of Henrys Fork near Rexburg, Idaho, for the year ending Sept. 30, 1915.

Month.	Discharge in second-feet.			Run-off (total in acre-feet).	Accuracy.
	Maximum.	Minimum.	Mean.		
October	3,280	2,510	2,880	177,000	A.
November	2,670	2,340	2,470	147,000	A.
December 1-12	2,420	....	2,230	53,200	B.
March 21-31	1,650	1,450	1,580	34,500	A.
April	3,100	1,450	2,460	146,000	A.
May	4,660	1,190	2,760	170,000	A.
June	6,200	866	2,840	169,000	B.
July	1,070	522	698	42,900	A.
August	1,170	518	761	46,800	B.
September	1,860	845	1,360	77,400	B.
The period	....	....	....	1,060,000	

NOTE.—See footnote to table of daily discharge.

WARM RIVER AT WARM RIVER, IDAHO.

LOCATION.—In sec. 13, T. 9 N., R. 43 E., Fremont County, at highway bridge half a mile above Warm River station on Yellowstone branch of Oregon Short Line Railroad, less than a quarter of a mile above Robinson Creek, and about half a mile above confluence of Warm River and Henrys Fork.

DRAINAGE AREA.—144 square miles (measured on Forest Service maps).

RECORDS AVAILABLE.—January 24, 1912, to March 22, 1915, when station was discontinued.

Gage.—Vertical staff attached to downstream side of bridge pier; read by Mrs. Josephine Stone.

Discharge measurements.—Made by wading at various sections near gage.

Channel and control.—Bed rocky. One channel at all stages. Control apparently shifting. Stage-discharge relation during part of year somewhat affected by growth of moss.

Extremes of discharge.—Maximum stage recorded October to March, 1.50 feet October 4 and 21 (discharge, 297 second-foot); minimum stage recorded, 1.32 feet December 16 and January 9 (discharge, 215 second-feet).

1912–1915: Maximum stage recorded, 2.3 feet June 2, 1912 (discharge, 900 second-feet); minimum stage recorded, 1.3 feet February 15 and 20 May 2, 5, and 7, 1912 (discharge, 192 second-feet).

Winter flow.—Stage-discharge relation unaffected by ice; open-channel rating curves assumed applicable.

Diversions.—None above station.

Regulation.—None.

Accuracy.—Standard rating curve only fairly well defined. Gage read to quarter-tenths about three times a week. Discharge determined by shifting-control method. Records fair.

The following discharge measurement was made by G. C. Baldwin:

March 22, 1915: Gage height, 1.33 feet; discharge, 228 second-feet.

Daily discharge, in second-feet, of Warm River at Warm River, Idaho, for the year ending Sept. 30, 1915.

Day.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Day.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.
1	254	243	249	....	233	238	16	270	249	215	233	233	....
2	270	243	262	....	233	238	17	270	249	224	233	236	....
3	284	243	275	229	233	238	18	270	249	234	233	238	....
4	297	246	262	229	233	238	19	270	249	243	233	238	....
5	292	249	249	229	233	238	20	284	249	243	233	238	....
6	286	249	275	229	233	238	21	297	249	243	233	238	....
7	270	249	267	229	233	224	22	284	249	243	233	238	229
8	270	249	259	222	233	224	23	270	249	243	233	238	....
9	270	249	258	215	233	224	24	243	249	....	233	238	....
10	270	249	256	229	233	224	25	248	249	....	233	238	....
11	270	249	255	236	233	224	26	254	249	....	233	238	....
12	270	249	254	243	233	224	27	254	249	....	233	238	....
13	270	249	229	241	233	224	28	254	249	....	233	238	....
14	270	249	225	238	233	....	29	248	249	....	233	....	....
15	270	249	220	235	233	....	30	243	249	....	233	....	....
							31	243	....	....	233	....	....

Note.—Gage read about three times a week and discharge interpolated on intervening days. Mean discharge estimated as follows: Dec. 24 to Jan. 2, 236 second-feet; March 14–21, 226 second-feet.

Monthly discharge of Warm River at Warm River, Idaho, for the year ending Sept. 30, 1915.

Month.	Discharge in second-feet.			Run-off (total in acre-feet).	Accuracy.
	Maximum.	Minimum.	Mean.		
October	297	243	268	16,500	B.
November	249	243	248	14,800	B.
December	275	215	244	15,000	B.
January	243	215	232	14,300	B.
February	238	233	235	13,100	B.
March 1-22	238	224	229	9,980	B.
The period	....	....	....	83,700	

Note.—See footnote to table of daily discharge.

ROBINSON CREEK AT WARM RIVER, IDAHO.

Location.—In sec. 13, T. 9 N., R. 43 E., Fremont County, at Oregon Short Line Railroad bridge, about one-third mile above Warm River station on the Yellowstone branch, and about 300 yards above mouth of creek.

Drainage area.—About 41 square miles (measured on Forest Service map).

Records available.—January 24, 1912, to March 22, 1915, when station was discontinued.

Gage.—Vertical staff attached to pile on downstream side of railroad bridge; read by Mrs. Josephine Stone.

Discharge measurements.—Made by wading or from bridge.

Channel and control.—Bed of stream composed of coarse gravel. Control is a well-defined cobble riffle about 150 feet below gage; apparently shifting.

Extremes of discharge.—Maximum stage recorded October to March, 2.25 feet at 4.40 p. m. October 6 (discharge, 151 second-feet); minimum stage recorded, 1.70 feet January 3 and 5 (discharge, 66 second-feet).

1912–1915: Maximum stage recorded, 4.3 feet May 28, 1912 (discharge, 1,140 second-feet); minimum stage recorded, 1.5 feet February 15, 1912 (discharge, 51 second-feet).

Winter flow.—Stage-discharge relation affected, during parts of the winter, by shore ice at control and by anchor ice; flow for such periods estimated from observer's notes and by comparison with records of flow at other stations.

Diversions.—None above station.

Regulation.—None.

Accuracy.—Rating curve well defined. Records good except for periods in which stage-discharge relation was affected by ice.

The following discharge measurement was made by G. C. Baldwin:

March 22, 1915: Gage height, 1.80 feet; discharge, 79 second-feet.

Daily discharge, in second-feet, of Robinson Creek at Warm River, Idaho, for the year ending Sept. 30, 1915.

Day.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Day.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.
1	100	93	86	....	79	70	16	112	89	....	....	72	....
2	100	93	86	....	79	72	17	116	85	....	....	70	....
3	112	93	86	66	79	70	18	129	81	....	....	68	....
4	125	93	86	66	79	68	19	142	81	....	....	68	....
5	138	93	86	66	79	68	20	142	81	....	....	68	....
6	151	93	86	69	79	68	21	142	81	....	....	72	....
7	133	93	....	72	77	68	22	138	79	....	....	72	79
8	124	93	....	76	74	68	23	133	79	....	....	72	....
9	116	93	....	79	72	68	24	133	79	....	....	72	....
10	116	93	....	86	72	68	25	116	79	....	....	72	....
11	116	93	....	84	72	68	26	100	79	....	....	72	....
12	116	93	....	81	72	68	27	96	79	....	....	72	....
13	116	93	....	....	72	68	28	96	79	....	....	68	....
14	112	93	....	....	72	....	29	94	81	....	....	....	....
15	108	93	....	....	72	....	30	93	83	....	....	....	....
							31	93	....	....	....	....	....

Note.—Gage read about three times a week; discharge for those days determined from a fairly well defined rating curve; interpolated for intervening days except when stage-discharge relation was affected by ice—Dec. 7 to Jan. 2 and Jan. 13–31. Mean discharge estimated as follows: Dec. 7–31, 80 second-feet; Jan. 1 and 2, 66 second-feet; Jan. 13–31, 75 second-feet; Mar. 14–21, 75 second-feet.

Monthly discharge of Robinson Creek at Warm River, Idaho, for the year ending Sept. 30, 1915.

Month.	Discharge in second-feet.			Run-off (total in acre-feet).	Accuracy.
	Maximum.	Minimum.	Mean.		
October	151	93	118	7,260	B.
November	93	79	87.0	5,180	B.
December	86	....	81.2	4,990	D.
January	86	66	74.3	4,570	D.
February	79	68	73.1	4,060	B.
March 1-22	79	68	71.4	3,120	C.
The period	....	....	....	29,200	

NOTE.—See footnote to table of daily discharge.

IDAHO (GOVERNMENT) CANAL NEAR SHELLEY, IDAHO.

LOCATION.—In sec. 31, T. 1 N., R. 37 E., Bingham County, 600 feet below the canal head gates, 1½ miles southwest of Shelley, and 10 miles above point where Sand Creek crosses canal.

RECORDS AVAILABLE.—June 20, 1912, to September 30, 1915. No water diverted during 1913 because of break in canal.

GAGE.—Inclined staff set in concrete of rating section on right bank; read by Ed. Hanks. Bristol water-stage recorder operated during previous seasons; inclined staff always used as reference gage.

DISCHARGE MEASUREMENTS.—Made by wading or from suspension footbridge about 3 feet below gage.

CHANNEL AND CONTROL.—Trapezoidal concrete rating section. Collection of brush and growth of aquatic plants cause changes in stage-discharge relation, but bottom of rating section evidently furnishes a permanent point of zero flow at about 0.0 on gage.

EXTREMES OF DISCHARGE.—Maximum stage recorded during the year, 2.83 feet at 1.30 p. m. August 5; maximum discharge at gage height 2.7 feet June 28 (discharge, 142 second-feet); minimum flow practically zero probably about 0.0 on gage but has not been definitely determined as no records are kept when head gates are shut down.

1912–1915: Maximum stage recorded, 3.7 feet July 29, 1912 (discharge, 308 second-feet); minimum as stated in preceding paragraph.

WINTER FLOW.—Canal not operated during winter.

DIVERSIONS.—None above station and none between station and outlet into Blackfoot River.

REGULATION.—Flow controlled at head gates about 600 feet above.

ACCURACY.—Stage-discharge relation affected by growth of weeds. Records fair.

Idaho canal diverts water from the left bank of Snake River in sec. 31, T. 1 N., R. 37 E., and discharges it into Blackfoot River in sec. 24, T. 2 S., R. 36 E. The canal receives water from Sand Creek about 10 miles below this station. For record at station below Sand Creek see page 64. Water discharged into Blackfoot River during the irrigation season is diverted by the Fort Hall upper and lower canals for use on Fort Hall reservation.

Discharge measurements of Idaho (Government) canal near Shelley, Idaho, during the year ending Sept. 30, 1915.

[Made by G. C. Baldwin.]

Month.	Gage height.	Discharge.	Month.	Gage height.	Discharge.	Month.	Gage height.	Discharge.
	Feet.	*Sec.-ft.*		*Feet.*	*Sec.-ft.*		*Feet.*	*Sec.-ft.*
July 9	2.09	88.4	Aug. 5	2.01	66.7	Aug. 5	2.81	121
9	1.70	59.0	5	1.15	23.5			

Daily discharge, in second-feet, of Idaho (Government) canal near Shelley, Idaho, during the year ending Sept. 30, 1915.

Day.	June.	July.	Aug.	Day.	June.	July.	Aug.	Day.	June.	July.	Aug.
1		102	53	11		104		21	62	54	
2		102	61	12		104		22	73	54	
3		97	67	13		90		23	89	54	
4		89	67	14		86		24	106	53	
5		89	63	15		85		25	110	53	
6		89	36	16		73		26	120	53	
7		89	10	17	12	69		27	133	58	
8		89		18	46	65		28	142	58	
9		89		19	59	62		29	106	51	
10		105		20	56	61		30	102	51	
								31		50	

NOTE.—Discharge determined from two fairly well defined rating curves and by shifting-control method. Head gates of canal closed Oct. 1 to June 16 and Aug. 8 to Sept. 30.

Monthly discharge of Idaho (Government) canal near Shelley, Idaho, for the year ending Sept. 30, 1915.

Month.	Discharge in second-feet.			Run-off (total in acre-feet).	Accuracy.
	Maximum.	Minimum.	Mean.		
June 17-30	142	12	86.9	2,410	C.
July	105	50	75.1	4,620	C.
August 1-7	67	10	51.0	708	B.
The period				7,740	

BLACKFOOT RIVER ABOVE RESERVOIR, NEAR HENRY, IDAHO.

LOCATION.—Approximately in sec. 9, T. 7 S., R. 42 E., at Cully's ranch, 1½ miles above flow line of Blackfoot-Marsh reservoir, 7 miles south of Henry, Bannock County.

DRAINAGE AREA.—360 square miles (measured on Land Office map).

RECORDS AVAILABLE.—March 25, 1914, to September 30, 1915.

GAGE.—Vertical staff on right bank, half a mile above Cully's house and about 200 feet below the shearing plant; read by Mrs. T. W. Cully. Original gage, used March 25 to September 30, 1914, was vertical staff attached to streamward side of right bridge pier about three-fourths mile above present site.

DISCHARGE MEASUREMENTS.—Made from cable at gage or by wading.

CHANNEL AND CONTROL.—Bed composed of loose rock, boulders, and gravel; rough, One channel at all stages. Right bank near gage probably subject to overflow at high stages. Control is of loose rock; fairly permanent.

EXTREMES OF DISCHARGE.—Maximum stage recorded during year, 3.6 feet at 10.30 a. m. May 22 (discharge, 537 second-feet); minimum stage recorded, 1.40 feet at 9.30 a. m., September 1 (discharge, 55 second-feet). Minimum discharge may have occurred during the winter, when stage-discharge relation was affected by ice.

1914-15: Maximum stage recorded, 6.45 feet at 3.15 p. m., April 24, 1914 (discharge, 1,450 second-feet); minimum, September 1, 1915.

Winter flow.—Stage-discharge relation seriously affected by ice; flow estimated from observer's notes, the discharge measurement of January 24, weather records, and by comparison with record of flow at Little Blackfoot River.

Diversions.—A few small ranch diversions only are made above gage.

Regulation.—None. Entire flow passing gage is impounded in Blackfoot-Marsh reservoir, 1½ miles below.

Accuracy.—Stage-discharge relation not permanent; affected by ice December 8 to March 21. Two well-defined rating curves used, one applicable October 23 to December 7 and June 5 to September 30, the other March 22 to April 26. Gage read once daily during open water and three times a week during winter. Daily discharge ascertained by applying daily gage heights to rating table; shifting-control method used April 27 to June 4. Open-water records good; winter records poor.

Discharge measurements of Blackfoot River above reservoir, near Henry, Idaho, during the year ending Sept. 30, 1915.

Date.	Made by—	Gage height.	Discharge.	Date.	Made by—	Gage height.	Discharge.
		Feet.	*Sec.-ft.*			*Feet.*	*Sec.-ft.*
Oct. 31	L. W. Roush	1.81	106	June 5	A. W. Harrington	3.02	356
Jan. 24	do.	[a]2.34	55.4	July 26	G. C. Baldwin	1,68	86.4
Apr. 26	G. C. Baldwin	2.33	219	Sept. 30	A. W. Harrington	1.68	84.1

[a] Stage-discharge relation affected by ice.

Daily discharge, in second-feet, of Blackfoot River above reservoir, near Henry, Idaho, for the year ending Sept. 30, 1915.

Day.	Oct.	Nov.	Dec.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.
1	....	101	137	....	233	254	303	130	88	55
2	....	101	146	....	265	329	252	130	88	56
3	....	101	152	....	296	329	238	122	88	70
4	....	101	157	....	296	316	194	122	88	76
5	....	101	163	....	322	288	351	122	88	82
6	....	101	154	....	377	288	351	115	88	65
7	....	101	146	....	419	250	351	122	88	70
8	....	108	....	....	419	213	298	138	88	70
9	....	115	....	....	448	224	298	130	82	70
10	....	101	....	....	477	247	272	130	76	70
11	....	115	....	....	506	233	247	138	76	70
12	....	130	....	....	536	222	224	122	76	76
13	....	122	....	....	477	200	247	115	76	82
14	....	108	....	....	506	188	260	115	76	82
15	....	101	....	....	448	220	260	115	70	76
16	....	130	....	....	391	188	213	115	70	76
17	....	134	....	....	350	176	202	108	76	76
18	....	138	....	....	322	206	202	101	76	76
19	....	133	....	....	309	329	202	101	76	74
20	....	127	....	....	258	423	202	94	76	70
21	....	122	....	....	322	480	182	94	76	70
22	....	122	....	108	377	537	172	94	70	70
23	115	122	....	112	322	507	163	88	70	65
24	108	122	....	115	283	448	154	88	70	65
25	108	122	....	115	258	446	130	88	70	65
26	101	117	....	115	223	446	122	88	70	88
27	108	113	....	115	200	417	146	88	65	146
28	115	108	....	153	211	359	146	88	65	122
29	115	117	....	191	231	359	138	88	63	88
30	122	127	....	196	231	359	130	88	60	88
31	101	....	....	202	....	303	....	88	58	....

Note.—No gage height record Oct. 1–22. Stage-discharge relation affected by ice Dec. 8 to Mar. 21. Discharge estimated from observer's notes, climatic data, and records at other stations, as follows: Oct. 1–22, 140 second-feet; Dec. 8 to Jan. 23, 70 second-feet; Jan. 24, 55 second-feet; Jan. 25–31, 65 second-feet; Feb. 1–28, 85 second-feet; Mar. 1–21, 100 second-feet.

Monthly discharge of Blackfoot River above the reservoir near Henry, Idaho, for the year ending Sept. 30, 1915.

Month.	Discharge in second-feet.			Run-off (total in acre-feet).	Accuracy.
	Maximum.	Minimum.	Mean.		
October	....	101	131	8,060	C.
November	138	101	115	6,840	B.
December	163	....	88.2	5,420	D.
January	....	....	68.4	4,210	D.
February	....	....	85.0	4,720	D.
March	202	....	114	7,010	C.
April	536	200	344	20,500	B.
May	537	176	316	19,400	B.
June	351	122	222	13,200	A.
July	138	88	109	6,700	A.
August	88	58	75.7	4,650	B.
September	146	55	77.0	4,580	A.
The year	537	....	145	105,000	

NOTE.—See footnote to table of daily discharge.

BLACKFOOT-MARSH RESERVOIR NEAR HENRY, IDAHO.

LOCATION.—In sec. 12, T. 5 S., R. 40 E., about 12 miles northwest of Henry, Bannock County.

RECORDS AVAILABLE.—January 1, 1912, to September 30, 1915.

GAGE.—Vertical staff near spillway at right end of dam; read twice daily to hundredths by J. B. Curtis. Zero of gage, 6,100 feet above sea-level.

EXTREMES OF STAGE.—Maximum stage recorded during year, 59.25 feet June 12, 13, and 15; minimum stage 48.72 feet at 6.15 p. m. September 30.

1912–1915: Maximum stage recorded 68.60 feet June 27–30, 1912; minimum stage 48.72 at 6.15 p. m. September 30, 1915.

COOPERATION.—Gage-height record furnished by United States Indian Service.

Daily gage height, in feet, of Blackfoot-Marsh reservoir near Henry, Idaho, for the year ending Sept. 30, 1915.

Day.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.
1	......	58.00	56.80	55.87	56.00	56.18	56.39	58.14	59.00	57.62	54.08	51.12
2	......	57.98	56.78	55.87	56.05	56.18	56.42	58.16	59.00	57.53	53.95	51.02
3	......	57.82	56.76	55.85	56.08	56.19	56.49	58.20	59.00	57.42	53.81	50.92
4	......	57.79	56.75	55.87	56.10	56.20	56.50	58.20	59.00	57.31	53.70	50.84
5	......	57.76	56.72	55.90	56.10	56.22	56.50	58.18	59.08	57.16	53.58	50.74
6	......	57.71	56.70	55.90	56.09	56.22	56.55	58.21	59.16	57.02	53.48	50.65
7	......	57.68	56.70	55.90	56.08	56.20	56.68	58.19	59.19	56.90	53.40	50.56
8	......	57.64	56.68	55.88	56.05	56.20	56.80	58.18	59.20	56.79	53.32	50.47
9	......	57.59	56.65	55.86	56.08	56.18	56.87	58.18	59.14	56.68	53.18	50.38
10	......	57.49	56.60	55.85	56.08	56.19	56.94	58.15	59.16	56.54	53.08	50.30
11	......	57.41	56.58	55.85	56.08	56.20	57.00	58.15	59.18	56.42	52.96	50.20
12	......	57.38	56.55	55.85	56.08	56.25	57.02	58.16	59.24	56.28	52.84	50.10
13	......	57.32	56.50	55.85	56.10	56.28	57.08	58.21	59.25	56.14	52.77	50.02
14	......	57.26	56.48	55.85	56.10	56.29	57.12	58.25	59.21	55.98	52.70	49.93
15	......	57.19	56.44	55.87	56.10	56.31	57.16	58.26	59.24	55.88	52.62	49.83
16	......	57.15	56.40	55.89	56.12	56.32	57.19	58.28	59.15	55.78	52.54	49.74
17	......	57.12	56.36	55.90	56.15	56.31	57.26	58.28	58.95	55.60	52.46	49.65
18	58.45	57.10	56.31	55.88	56.15	56.33	57.30	58.29	58.90	55.49	52.38	49.56
19	58.42	57.05	56.27	55.87	56.15	56.34	57.36	58.30	59.00	55.38	52.32	49.47
20	58.42	57.00	56.25	55.88	56.15	56.32	57.48	58.34	58.95	55.30	52.25	49.38
21	58.40	56.95	56.20	55.95	56.18	56.33	57.62	58.40	58.88	55.20	52.16	49.30
22	58.39	56.92	56.15	56.00	56.18	56.34	57.76	58.52	58.80	55.10	55.10	49.22
23	58.38	56.90	56.09	55.90	56.20	56.36	57.87	58.59	58.72	54.98	52.02	49.12
24	58.35	56.90	56.05	55.87	56.20	56.38	57.96	58.64	58.68	54.88	51.92	49.02
25	58.28	56.86	56.00	55.90	56.22	56.40	58.02	58.69	58.49	54.78	51.82	48.95
26	58.22	56.85	55.92	55.90	56.21	56.40	58.10	58.76	58.38	54.68	51.72	48.91
27	58.15	56.85	55.90	55.90	56.20	56.40	58.11	58.80	58.27	54.58	51.60	48.86
28	58.14	56.87	55.90	56.00	56.18	56.40	58.10	58.78	58.18	54.48	51.50	48.83
29	58.11	56.88	55.87	56.00	......	56.38	58.08	58.84	58.00	54.38	51.40	48.80
30	58.10	56.82	55.86	56.00	......	56.38	58.11	58.90	57.76	54.28	51.32	48.74
31	58.05	......	55.90	56.00	......	56.36	......	58.96	......	54.20	51.22	......

NOTE.—No record received Oct. 1–17.

BLACKFOOT RIVER NEAR HENRY, IDAHO.

Location.—In sec. 11, T. 5 S., R. 40 E., 200 feet below wagon bridge at Rockyford crossing, 1 mile below Blackfoot-Marsh dam of the United States Indian Service, and about 12 miles northwest of Henry, Bannock County.

Drainage area.—Not measured.

Records available.—July 15, 1908, to September 30, 1915.

Gage.—Friez water-stage recorder installed September 18, 1912, in wooden shelter on left bank; referred to outside vertical staff gage. Prior to September 18, 1912, gage was a vertical staff a few feet downstream from site of present gage. Original gage settled 0.11 foot between July 15, 1908, and May 25, 1912; datum of present gage same as that of original gage May 25, 1912. Recorder inspected and staff gage read daily by J. B. Curtis.

Discharge measurements.—Made from cable 600 feet above gage or by wading.

Channel and control.—Bed composed of lava rock, boulders, and gravel. One channel at all stages. Control fairly permanent. State-discharge relation at times affected by growth of moss.

Extremes of discharge.—Maximum stage recorded during year, 3.50 feet June 25–28 and July 1–4 (discharge, 1,060 second-feet); minimum stage recorded, 0.70 foot at 1.30 p. m. January 21 (measured discharge, 3.3 second-feet).

1908–1915: Maximum stage recorded, 4.15 feet May 14, 1909 (discharge, 1,640 second-feet); minimum stage recorded January 21, 1915.

Winter flow.—Stage-discharge relation not affected by ice; owing to proximity of station to reservoir, channel remains open.

Diversions.—Only a few small diversions are made for irrigation from river and tributaries above reservoir.

Regulation.—Flow controlled by gates at dam.

Accuracy.—Stage-discharge relation affected by growth of aquatic plants. Two well-defined rating curves used, one applicable October 1 to February 4, the other February 5 to September 30. Recorder not in operation October 1 to March 31; stage determined from daily readings on staff gage; mean daily gage heights for rest of year obtained by inspecting recorder graph. Daily discharge ascertained by applying daily gage heights to rating table. Records good.

Discharge measurements of Blackfoot River near Henry, Idaho, during the year ending Sept. 30, 1915.

Date.	Made by—	Gage height.	Discharge.	Date.	Made by—	Gage height.	Discharge.
		Feet.	*Sec.-ft.*			*Feet.*	*Sec.-ft.*
Nov. 4	L. W. Roush	2.42	493	Apr. 25	G. C. Baldwin	1.97	254
4	do	2.12	325	June 3	A. W. Harrington	2.00	274
Jan. 20	do	1.55	141	3	do	2.29	404
20	do	1.01	38.6	3	do	2.60	551
21	do	.70	3.3	July 24	G. C. Baldwin	2.98	761
Apr. 24	G. C. Baldwin	1.98	250	25	do	2.98	762

Daily discharge, in second-feet, of Blackfoot River near Henry, Idaho, for the year ending Sept. 30, 1915.

Day.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.
1	628	522	424	127	111	112	234	268	272	1,060	753	553
2	656	497	448	127	49	112	238	272	276	1,060	747	553
3	656	497	472	127	49	112	253	272	326	1,060	741	553
4	656	472	472	127	44	117	253	272	276	1,060	741	548
5	656	472	497	127	47	117	253	272	276	1,030	741	543
6	741	472	497	127	57	117	261	264	280	1,030	741	543
7	886	497	522	127	57	117	245	264	280	1,030	741	543
8	916	522	522	127	59	112	234	264	276	1,030	741	538
9	916	574	522	127	59	115	257	264	280	1,000	741	538
10	857	628	522	127	59	117	272	264	280	1,000	741	533
11	684	656	522	133	59	115	272	264	276	1,000	712	528
12	......	684	522	130	59	112	272	264	272	1,000	601	528
13	......	741	522	130	59	112	272	264	272	1,000	574	528
14	......	574	522	130	59	112	272	264	272	1,000	574	528
15	......	334	522	130	59	112	268	264	272	946	574	528
16	......	272	522	127	59	128	268	264	356	828	569	522
17	......	234	522	127	59	144	272	264	684	770	569	517
18	378	216	522	127	59	144	272	264	770	753	564	517
19	378	209	522	133	59	144	272	264	770	758	559	517
20	378	199	522	121	59	144	272	264	770	747	559	517
21	378	156	472	108	59	144	272	268	770	741	559	517
22	401	133	378	182	59	155	272	268	758	753	553	517
23	424	127	378	182	59	167	272	272	753	770	553	522
24	448	169	378	182	63	167	268	272	887	764	553	512
25	448	216	378	182	63	199	264	272	1,060	758	559	522
26	472	216	378	182	87	234	264	272	1,060	758	559	528
27	472	216	284	182	112	234	264	272	1,060	758	559	502
28	497	234	169	182	112	234	264	272	1,060	758	559	492
29	497	334	133	182	......	234	264	272	1,030	753	548	487
30	522	401	121	182	......	234	268	272	1,030	753	548	482
31	522	......	127	189	......	234	......	272	......	758	548	......

NOTE.—No record obtained Oct. 12-17, mean discharge estimated at 480 second-feet.

Monthly discharge of Blackfoot River near Henry, Idaho, for the year ending Sept. 30, 1915.

Month.	Discharge in second-feet.			Run-off (total in acre-feet).	Accuracy.
	Maximum.	Minimum.	Mean.		
October	916	378	560	34,400	B.
November	741	127	382	22,700	B.
December	522	121	429	26,400	B.
January	189	103	145	8,920	B.
February	112	44	641	3,560	C.
March	234	112	150	9,220	B.
April	272	234	263	15,600	B.
May	272	264	268	16,500	A.
June	1,060	272	567	33,700	A.
July	1,060	741	887	54,500	A.
August	753	548	625	38,400	A.
September	553	482	525	31,200	A.
The year	1,060	44	408	296,000	

BLACKFOOT RIVER NEAR SHELLEY, IDAHO.

LOCATION.—In sec. 7, T. 2 S., R. 38 E., Bingham County, 1½ miles above mouth of canyon, 3 miles above the N. A. Just ranch, 10 miles southeast of Shelley; below all important tributaries.

DRAINAGE AREA.—Not measured.

RECORDS AVAILABLE.—June 26, 1909, to September 30, 1915. From April 17, 1903, to December 31, 1909, records were obtained near Presto, about 5 miles below site of present station; no tributaries enter between the two sites, but during the irrigation season several ditches divert probably 50 second-feet.

GAGE.—Friez water-stage recorder on right bank; observer, Rufus E. Reid.

CHANNEL AND CONTROL.—Bed rocky and rough. One channel at all stages. Control somewhat shifting.

EXTREMES OF DISCHARGE.—Maximum stage recorded during year, 5.50 feet at 2.30 p. m. June 26 and 2 p. m. July 3 (discharge, 1,120 second-feet); minimum stage recorded, 3.33 feet at 3 p. m. February 12 (discharge, 85 second-feet). Lower stages may have occurred during January or the first part of February, when the stage-discharge relation was affected by ice.

1909–1915. Maximum stage recorded, 5.80 feet at 11.45 p. m. April 1, 1913 (discharge, 1,370 second-feet); minimum stage recorded about 3.1 feet December 29, 1911 (discharge, 45 second-feet).

WINTER FLOW.—Stage-discharge relation seriously affected by ice; flow estimated from discharge measurements and comparison with record of flow at station near Henry.

DIVERSIONS.—No important diversions from river or tributaries above station.

REGULATION.—Flow regulated largely by storage in the Blackfoot-Marsh reservoir of the United States Indian Service, about 40 miles upstream.

ACCURACY.—Stage-discharge relation not permanent; affected by ice December, January, and February. Rating curves well defined by measurements except during winter months. Mean daily gage heights obtained by inspecting recorder graph. Daily discharge, except for periods during which stage-discharge relation was affected by ice, ascertained by applying daily gage heights to rating table. Records good.

Discharge measurements of Blackfoot River near Shelley, Idaho, during the year ending Sept. 30, 1915.

Date.	Made by—	Gage height.	Discharge.	Date.	Made by—	Gage height.	Discharge.
		Feet.	*Sec.-ft.*			*Feet.*	*Sec.-ft.*
Oct. 27	L. W. Roush	4.53	524	May 24	A. W. Harrington	4.39	433
28	do	4.51	519	Aug. 4	G. C. Baldwin	5.08	774
Jan. 16	do	[a] 4.41	131	Sept. 23	A. W. Harrington	4.59	525
Mar. 26	G. C. Baldwin	4.23	372				

[a] Stage-discharge relation affected by ice.

Daily discharge, in second-feet, of Blackfoot River near Shelley, Idaho, for the year ending Sept. 30, 1915.

Day.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.
1	534	560	429	......	......	140	353	393	425	1,120	829	576
2	702	560	439	......	......	140	366	389	425	1,120	822	576
3	702	560	468	......	......	140	388	385	425	1,120	816	582
4	690	560	473	......	......	140	397	381	425	......	810	587
5	......	545	468	......	......	142	366	378	425	......	810	576
6	......	571	483	......	......	142	370	374	416	......	810	576
7	......	582	478	......	......	140	379	370	411	......	803	571
8	......	632	493	......	......	140	366	366	406	......	810	571
9	......	649	503	......	......	142	357	362	397	......	796	566
10	1,000	684	545	......	......	142	379	375	393	......	790	566
11	......	733	519	......	......	142	379	375	388	......	784	571
12	......	777	519	......	......	145	379	370	393	......	764	576
13	......	784	539	......	113	150	379	366	388	1,040	649	576
14	......	739	......	......	115	150	379	370	384	1,040	643	576
15	......	444	......	......	126	150	379	366	379	1,040	638	571
16	......	397	......	131	137	150	379	362	375	897	633	571
17	458	384	......	......	128	172	379	362	582	863	628	566
18	458	375	......	......	124	175	375	375	796	810	624	560
19	458	348	......	......	117	172	370	379	829	803	619	550
20	458	340	......	......	117	172	370	379	......	796	614	545
21	458	303	......	......	117	178	388	425	......	790	609	539
22	458	303	......	......	119	193	406	429	......	784	604	534
23	463	276	......	......	117	231	406	425	......	816	598	529
24	534	276	......	......	117	272	388	434	......	816	593	545
25	534	276	......	......	122	307	379	434	......	816	587	545
26	529	280	......	......	122	357	375	429	1,120	810	582	604
27	524	280	......	......	135	344	366	420	1,120	816	576	555
28	514	284	......	......	140	362	362	420	1,120	816	582	534
29	529	311	......	......	......	416	357	420	1,120	810	582	529
30	545	425	......	......	......	362	379	406	1,120	810	576	529
31	560	......	......	......	......	348	......	402	......	816	576	......

NOTE.—Discharge estimated on account of ice and lack of gage heights as follows: Oct. 5–9, 832 second-feet; Oct. 11–16, 690 second-feet; Dec. 14–21, 550 second-feet; Dec. 22–28, 410 second-feet; Dec. 29–31, 170 second-feet; Jan. 1–15 and 17–21, 160 second-feet; Jan. 22–31, 220 second-feet; Mar. 1–12, 105 second-feet; June 20–25, 875 second-feet., and July 4–12, 1,080 second-feet.

Monthly discharge of Blackfoot River near Shelley, Idaho, for the year ending Sept. 30, 1915.

Month.	Discharge in second-feet.			Run-off (total in acre-feet).	Accuracy.
	Maximum.	Minimum.	Mean.		
October	....	458	626	38,509	B.
November	784	276	475	28,300	B.
December	....	....	456	28,000	C.
January	....	....	178	10,900	C.
February	140	....	115	6,390	C.
March	416	140	205	12,600	B.
April	406	353	376	22,400	A.
May	434	362	391	24,000	B.
June	1,120	375	650	38,700	B.
July	1,120	784	944	58,000	B.
August	829	576	682	41,900	A.
September	604	529	562	33,400	A.
The year	1,120	....	474	343,000	

NOTE.—See footnote to table of daily discharge.

BLACKFOOT RIVER NEAR BLACKFOOT, IDAHO.

Location.—In sec. 27, T. 3 S., R. 34 E., Bingham County, at the Jarvis ranch, 2 miles above junction of Blackfoot River with Snake River and 8 miles southwest of Blackfoot.

Drainage area.—Not measured.

Records available.—July 27, 1913, to September 30, 1915. Records obtained only when stored water from Jackson Lake is being carried in Snake River.

Gage.—Inclined staff on right bank half a mile south of the Jarvis ranch house; read by Ardell Olmstead.

Discharge measurements.—Made from a cable near gage or by wading.

Channel and control.—Bed composed of gravel; control presumably of the same material; fairly permanent. One channel at all stages. Banks covered with a heavy growth of brush and willows which may affect stage-discharge relation at high stages.

Extremes of discharge.—Maximum stage recorded during year, 8.6 feet at 6.10 p. m., September 29 (discharge, 643 second-feet); water below gage 7.20 p. m., June 17 (discharge estimated at 40 second-feet).

1913–1915. Maximum stage recorded, 8.7 feet September 21–22, 1914 (discharge, 673 second-feet); water below gage June 17, 1915.

Winter flow.—No records.

Diversions.—Principal diversions above gage are the Fort Hall canals near Blackfoot, but several smaller diversions are made in the vicinity of Blackfoot.

Regulation.—Flow regulated by storage in the Blackfoot-Marsh Reservoir of the United States Indian Service.

Accuracy.—Stage-discharge relation permanent during period of record. Rating curve fairly well defined. Gage read to hundredths once daily Daily discharge ascertained by applying gage heights to rating table. Records good.

Discharge measurements of Blackfoot River near Blackfoot, Idaho, during the year ending Sept. 30, 1915.

Date.	Made by—	Gage height.	Discharge.	Date.	Made by—	Gage height.	Discharge.
		Feet.	*Sec.-ft.*			*Feet.*	*Sec.-ft.*
June 10	A. W. Harrington....	6.73	347	Aug. 3	G. C. Baldwin.......	6.48	300
July 11	G. C. Baldwin.......	6.90	349	Sept. 21	A. W. Harrington....	7.09	384
15	.....do...............	7.00	383				

Daily discharge, in second-feet, of Blackfoot River near Blackfoot, Idaho, for the year ending Sept. 30, 1915.

Day.	June.	July.	Aug.	Sept.	Day.	June.	July.	Aug.	Sept.
1	....	214	228	174	16	56	316	187	394
2	....	228	271	187	17	40	256	174	394
3	....	228	301	187	18	124	174	174	378
4	....	228	331	200	19	161	148	174	378
5	....	242	316	214	20	161	154	161	410
6	....	256	316	256	21	200	136	174	394
7	....	242	346	256	22	148	136	200	378
8	....	286	346	271	23	97	118	214	426
9	....	286	346	316	24	82	124	214	426
10	331	316	331	316	25	78	124	200	426
11	292	362	410	331	26	161	124	174	507
12	253	410	286	331	27	200	136	174	609
13	214	410	256	346	28	242	142	187	626
14	175	394	200	410	29	242	142	174	643
15	136	378	187	410	30	228	161	174	626
					31	....	174	174	....

Note.—Station not in operation prior to June 10. No gage heights received June 11–14 and 17. Discharge interpolated June 11–14 and estimated from notes by observer June 17.

Monthly discharge of Blackfoot River near Blackfoot, Idaho, for the year ending Sept. 30, 1915.

Month.	Discharge in second-feet.			Run-off (total in acre-feet).	Accuracy.
	Maximum.	Minimum.	Mean.		
June 10-30	331	40	172	7,160	B.
July	410	118	227	14,000	B.
August	410	161	239	14,700	B.
September	643	174	374	22,300	B.
The period				58,200	

LITTLE BLACKFOOT RIVER AT HENRY, IDAHO.

Location.—In sec. 10, T. 6 S., R. 42 E., on Skinner's ranch, at Henry, Bannock County, a short distance above flow line of Blackfoot-Marsh reservoir.

Drainage area.—Not measured.

Records available.—March 24, 1914, to September 30, 1915.

Gage.—Vertical staff fastened to log across stream just below Skinner's barn. Read by Beatrice Skinner.

Discharge measurements.—Made by wading.

Channel and control.—Bed composed of rock, sand, and gravel. Control is rock crest of an 8-foot falls. Stage-discharge relation affected by growth of aquatic plants during large part of year.

Winter flow.—Stage-discharge relation not affected by ice; channel kept open by warm springs.

Extremes of discharge.—Maximum stage recorded during year, 2.6 feet at 7 p. m., April 6 (discharge, 124 second-feet); minimum stage, 1.33 feet January 1 and 3 (discharge, 11 second-feet). Minimum discharge may have occurred in August.

1914–15. Maximum stage recorded, 3.5 feet at 8 p. m., April 19, 1914 (discharge, determined from extension of rating curve, about 292 second-feet); minimum stage, 1.20 feet March 24, April 1 and 2, and from 6 p. m., July 4, to July 7, 1914; minimum discharge, determined by shifting-control method, 6.9 feet July 5, 6, and 7, 1914.

Diversions.—A ditch for watering stock takes out about 300 feet above station and a small ditch diverts water from the warm springs that enter the river between station and reservoir.

Regulation.—None.

Accuracy.—Stage-discharge relation affected by growth of aquatic plants, but changes up to July 23 are well defined by measurements. Rating curve fairly well defined January 22 to April 30. Gage read to hundredths twice daily. Daily discharge ascertained by applying daily gage heights to rating table January 22 to April 30 and by shifting-control method for rest of year except October 1–3 and July 24 to September 28. Records fair, except those for July 23 to September 30, which are poor.

Discharge measurements of Little Blackfoot River at Henry, Idaho, during the year ending Sept. 30, 1915.

Date.	Made by—	Gage height.	Discharge.	Date.	Made by—	Gage height.	Discharge.
		Feet.	*Sec.-ft.*			*Feet.*	*Sec.-ft.*
Nov. 1	L. W. Roush	1.38	17.7	June 4	A. W. Harrington	1.85	29.6
Jan. 22	do	1.46	15.0	July 23	G. C. Baldwin	1.78	15.8
Apr. 26	G. C. Baldwin	1.52	18.0	Sept. 29	A. W. Harrington	1.46	15.7

Daily discharge, in second-feet, of Little Blackfoot River at Henry, Idaho, for the year ending Sept. 30, 1915.

Day.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Sept.
1	....	16	13	11	16	26	41	22	47	21	....
2	....	16	13	11	16	26	35	26	50	21	....
3	....	16	13	11	16	26	51	29	37	21	....
4	13	16	13	11	16	26	50	20	29	21	....
5	14	15	14	12	16	27	62	20	29	21	....
6	14	15	16	12	16	27	88	19	29	20	....
7	14	15	15	12	16	27	72	18	27	26	....
8	14	15	14	13	16	29	51	18	26	23	....
8	17	15	14	14	16	29	35	16	25	20	....
10	20	15	14	13	18	29	29	26	25	19	....
11	19	14	14	14	19	29	29	21	25	19	....
12	21	14	14	14	19	30	24	24	24	19	....
13	24	14	14	14	19	32	21	20	25	22	....
14	21	14	15	14	19	33	19	18	24	25	....
15	19	14	17	13	19	33	18	18	24	25	....
16	17	14	17	13	19	33	19	17	24	24	....
17	17	14	15	13	19	32	19	19	24	25	....
18	16	14	14	14	20	33	17	24	24	24	....
19	17	14	14	13	21	33	18	31	23	24	....
20	15	14	12	14	22	34	19	41	23	24	....
21	17	14	12	14	23	33	23	56	23	22	....
22	17	14	12	14	24	30	27	55	22	22	....
23	17	14	12	14	25	29	22	50	22	16	....
24	16	14	12	14	25	29	18	44	22	....	....
25	16	14	12	14	25	29	18	40	22	....	....
26	16	14	12	14	26	27	17	35	22	....	....
27	16	14	12	14	26	33	16	31	22	....	....
28	16	14	12	14	26	43	16	29	22	....	....
29	16	14	11	14	....	36	16	40	21	....	18
30	16	13	11	15	....	38	20	51	21	....	17
31	16	....	11	15	....	50	....	33	....	....	....

NOTE.—Discharge estimated as follows: Oct. 1–3, 14 second-feet; July 24–31, 15 second-feet; Aug. 1–31, 13 second-feet; Sept. 1–28, 14 second-feet.

Monthly discharge of Little Blackfoot River at Henry, Idaho, for the year ending Sept. 30, 1915.

Month.	Discharge in second-feet.			Run-off (total in acre-feet).	Accuracy.
	Maximum.	Minimum.	Mean.		
October	24	13	16.5	1,010	C.
November	16	13	14.4	857	B.
December	17	11	13.4	824	C.
January	15	11	13.3	818	B.
February	26	16	19.9	1,110	B.
March	50	26	31.3	1,920	B.
April	88	16	30.3	1,800	B.
May	56	16	29.4	1,810	B.
June	50	21	26.1	1,550	B.
July	26	....	20.1	1,240	C.
August	....	....	13.0	799	D.
September	....	....	14.2	845	C.
The year	88	....	20.2	14,600	

MEADOW CREEK NEAR HENRY, IDAHO.

Location.—In sec. 3, T. 6 S., R. 42 E., half a mile above flow line of Blackfoot-Marsh reservoir, three-fourths mile below Goose Lake or Pelican Slough, and 1½ miles northeast of Henry, Bannock County.

Drainage area.—Not measured.

Records available.—April 17, 1914, to September 30, 1915.

Gage.—Stevens water-stage recorder installed June 27, 1914, on left bank. Vertical staff at same site and datum used April 17 to June 26, 1914. Mrs. John B. Curtis, observer.

Discharge measurements.—Made by wading or from cable at gage.

Channel and control.—Control consisted originally of an old-rock diversion dam about 100 feet below gage, but this dam was torn out August 17–19 and stage-discharge relation entirely changed. New control is of rocks and gravel; somewhat shifting. One channel at all stages, but banks are very brushy and stage-discharge relation may be affected.

Extremes of discharge.—Maximum stage recorded during year, 2.94 feet at 3 p. m. May 26 (discharge, 50 second-feet); minimum stage recorded, 1.36 feet at 2 p. m. September 1 (discharge, 2.2 second-feet).

1914–15: Maximum stage recorded, 4.39 feet April 17, 1914 (discharge, 281 second-feet); minimum stage recorded September 1, 1915.

Winter flow.—Stage-discharge relation seriously affected by ice; observations discontinued during winter.

Diversions.—No known diversions above gage.

Regulation.—None.

Accuracy.—Stage-discharge relation not permanent. Two rating curves used, each fairly well defined, one applicable October 2 to November 20 and April 25 to August 16, the other August 20 to September 30. Records lacking for several short periods, owing to unsatisfactory operation of water-stage recorder. Mean daily gage heights obtained by inspecting recorder graph. Daily discharge ascertained by applying gage heights to rating tables. Records good for June and July and fair for other months.

Discharge measurements of Meadow Creek near Henry, Idaho, during the year ending Sept. 30, 1915.

Date.	Made by—	Gage height.	Discharge.	Date.	Made by—	Gage height.	Discharge.
		Feet.	*Sec.-ft.*			*Feet.*	*Sec.-ft.*
Oct. 30	L. W. Roush.........	2.47	18.8	June 4	A. W. Harrington....	2.76	34.4
Jan. 19	.....do................	[a] 2.11	7.8	July 24	G. C. Baldwin.......	1.99	4.4
Apr. 25	G. C. Baldwin.......	2.79	39.4	Sept. 29	A. W. Harrington....	2.06	21.7

[a] Stage-discharge relation affected by ice.

Daily discharge, in second-feet, of Meadow Creek near Henry, Idaho, for the year ending Sept. 30, 1915.

Day.	Oct.	Nov.	Apr.	May.	June.	July.	Aug.	Sept.
1	17	18		28	37	6.0	4.6	2.3
2	16	18		30	37	5.4	4.8	2.6
3	16	17		34	36	5.4	4.8	
4	16	17		33	35	5.4	4.6	
5	20	17		32	34	5.2	4.6	
6	20	17		32	32	5.0	4.6	
7	20	17		31	30	5.0	4.6	
8	25	17		30	29	5.2	4.8	
9	25	16			27	5.8	4.8	
10	31	16			24	6.0	4.4	
11	31	16			23	5.8	4.6	
12	31	16			22	5.2	4.6	
13	25	16			21	5.0	4.6	
14	25	15			20	5.0	4.4	
15	20	11		22	20	4.8	4.4	
16	20	11		20	19	4.4	4.6	
17	20	10		19	17	4.6		
18	20	10		24	16	4.6		
19	20	10		29	15	4.4		
20	20	10		34	13	4.4	5.2	8.4
21	20			39	13	4.3	5.0	8.5
22	20			44	12	4.6	4.8	8.6
23	20			45	11	5.0	4.6	8.7
24	20			48	10	4.4	4.4	8.8
25	20		37	49	9.5	4.4	4.4	8.9
26	20		34	49	8.9	4.3	3.8	15
27	20		32	47	8.4	4.3	3.3	18
28	20		29	44	8.2	4.4	3.0	20
29	20		27	40	7.1	4.6	2.7	22
30	19		27	36	6.6	4.3	2.5	21
31	19			37		4.3	2.3	

NOTE.—No record Nov. 21 to Apr. 24. Discharge interpolated on account of lack of gage heights Oct. 1, May 4-7, 18-21, Sept. 21-24, 27, and 28. Discharge estimated as follows: Nov. 21-30, 10 second-feet; May 9-14, 30 second-feet; Aug. 17-19, 4.9 second-feet; Sept. 3-19, 5.0 second-feet.

Monthly discharge of Meadow Creek near Henry, Idaho, for the year ending Sept. 30, 1915.

Month.	Discharge in second-feet.			Run-off (total in acre-feet).	Accuracy.
	Maximum.	Minimum.	Mean.		
October	31	16	21.2	1,300	C.
November	18		13.2	786	C.
April 25-30	37	27	31.0	369	B.
May	49	19	34.1	2,100	C.
June	37	6.6	20.1	1.200	A.
July	6.0	4.3	4.89	301	B.
August	5.2	2.3	4.34	267	C.
September	22	2.3	7.93	472	D.

NOTE.—See footnote to table of daily discharge.

IDAHO (GOVERNMENT) CANAL NEAR FIRTH, IDAHO.

Location.—In sec. 13, T. 2 S., R. 36 E., Bingham County, 100 feet above double metal flume by which canal crosses the Eastern Idaho Slough, one-fourth mile below nearest highway bridge, 1½ miles below the point where Sand Creek crosses the canal, 5 miles southeast of Firth, and about 5 miles above point where canal discharges into Blackfoot River.

Records available.—March 29, 1914, to September 30, 1915.

Gage.—Friez water-stage recorder on left bank, inspected by J. A. Vaughn.

Discharge measurements.—Made by wading or from one of the highway bridges above station.

Channel and control.—Bed of canal composed of silt, sand, and fine gravel; probably shifts slightly; flume heading just below gage furnishes what should be a permanent control for high stages. Point of zero flow about gage height 0.6 foot.

Extremes of discharge.—Maximum stage recorded during year, 4.20 feet at 6 p. m May 12 (discharge, 288 second-feet); minimum discharge practically zero, but can not be exactly determined as water was below inlet pipe to float well.

1914–15: Maximum stage recorded, 4.29 feet at 5 a. m., May 9, 1914 (discharge, 315 second-feet); minimum practically zero, as stated in preceding paragraph.

Winter flow.—Stage-discharge relation seriously affected by ice. Data insufficient to warrant determinations.

Diversions.—None above station or between station and outlet of canal into Blackfoot River.

Regulation.—Flow regulated partly by Snake River head gates, 12 miles above station, and partly by gates at the Sand Creek crossing, about 1½ miles above.

Accuracy.—Stage-discharge relation practically permanent; affected by ice from December 9 to about March 13. Rating curve well defined above 40 second-feet. Recorder not operated during winter; outside staff gage read weekly December 9 to March 13. Mean daily gage heights obtained by inspecting recorder graph. Daily discharge ascertained by applying gage heights to rating table. Records of flow exceeding 40 second-feet excellent; for lower flow records are less reliable because of poorer definition of rating curve and possible shifting of canal bed.

Idaho (Government) canal diverts water from left bank of Snake River in sec. 31, T. 1 N., R. 37 E., and discharges into Blackfoot River in sec. 24, T. 2 S., R. 36 E. The canal receives water from Sand Creek about 1½ miles above this station. Water discharged into Blackfoot River during the irrigation season is diverted by the Fort Hall upper and lower canals for use on Fort Hall reservation. For record at station at head of canal see page 51.

Discharge measurements of Idaho (Government) canal near Firth, Idaho, during the year ending Sept. 30, 1915.

Date.	Made by—	Gage height.	Discharge.	Date.	Made by—	Gage height.	Discharge.
		Feet.	*Sec.-ft.*			*Feet.*	*Sec.-ft.*
Oct. 28	L. W. Roush........	1.98	51.8	Apr. 21	G. C. Baldwin.......	2.48	85.5
Jan. 15	.....do...............	2.65	7.6	May 23	A. W. Harrington....	3.67	212
Mar. 26	G. C. Baldwin.......	1.24	11.6	Aug. 4	G. C. Baldwin.......	2.18	67.6
27	.....do...............	1.38	18.2	Sept. 23	A. W. Harrington....	2.37	81.0

Daily discharge, in second-feet, of Idaho (Government) canal near Firth, Idaho, for the year ending Sept. 30, 1915.

Day.	Oct.	Nov.	Dec.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.
1	142	88	66	....	22	90	158	73	40	....
2	136	90	63	....	20	142	164	72	51	....
3	142	87	56	....	24	170	226	70	52	....
4	152	87	59	....	47	176	240	75	64	....
5	158	89	54	....	94	170	233	83	53	....
6	152	81	54	....	102	158	226	79	44	....
7	129	79	59	....	124	152	220	107	16	14
8	136	80	52	....	152	134	200	147	9	17
9	136	65	....	....	176	170	170	188	10	20
10	131	73	....	....	176	182	118	226	10	20
11	124	76	....	....	158	188	75	214	....	17
12	127	70	....	....	170	274	76	164	....	15
13	120	57	....	....	176	267	57	104	....	23
14	115	61	....	....	176	240	51	92	....	50
15	113	68	....	....	164	158	28	73	....	53
16	106	51	....	....	158	113	13	52	....	61
17	93	46	....	13	142	110	46	35	....	62
18	76	62	....	10	125	96	44	35	....	59
19	51	54	....	8	113	120	56	44	....	67
20	49	62	....	11	94	142	44	50	4	73
21	49	63	....	13	87	164	66	47	13	66
22	52	59	....	16	88	188	61	45	26	68
23	50	67	....	15	142	220	52	44	61	82
24	64	62	....	12	147	246	67	44	35	95
25	65	64	....	13	136	220	68	39	9	96
26	61	71	....	13	126	200	76	39	4	96
27	55	76	....	18	116	194	115	41	....	134
28	55	70	....	17	107	194	100	42	....	194
29	64	70	....	15	98	194	76	40	....	164
30	84	76	....	18	90	194	75	39	....	108
31	85	....	....	28	....	176	....	38	....	....

NOTE.—Water surface below inlet to recorder well Aug. 11-19 and Aug. 27 to Sept. 6, mean discharge estimated at 3 second-feet.

Monthly discharge of Idaho (Government) canal near Firth, Idaho, for the year ending Sept. 30, 1915.

Month.	Discharge in second-feet.			Run-off (total in acre-feet).	Accuracy.
	Maximum.	Minimum.	Mean.		
October	158	49	99.1	6,090	A.
November	90	46	70.1	4,170	A.
December 1-8	66	52	57.9	919	B.
March 17-31	28	8	14.7	437	B.
April	176	20	118	7,020	B.
May	274	90	176	10,800	A.
June	240	13	107	6,370	A.
July	226	35	78.7	4,840	A.
August	64	....	17.5	1,080	D.
September	194	....	55.7	3,310	B.

NOTE.—See footnote to table of daily discharge.

FORT HALL UPPER CANAL NEAR BLACKFOOT, IDAHO.

LOCATION.—In sec. 13, T. 3 S., R. 35 E., Bingham County, 500 feet below the head gates and 3½ miles southeast of Blackfoot.

RECORDS AVAILABLE.—May 8, 1912, to September 30, 1915.

GAGE.—Vertical staff in stilling well on the right bank and sloping gage painted on the right side and about midway of concrete rating section. Bristol water stage recorder used during 1912 and parts of 1913 and 1914. All gages set to same datum and at practically same location. Gage read by the ditch rider and gate tender.

Discharge measurements.—Made by wading or from suspension foot bridge at gage.

Channel and control.—Concrete trapezoidal rating section.

Extremes of discharge.—Maximum stage recorded during 1912–1915, 4.30 feet July 7–13, 17, and 23–26, 1915 (discharge, 341 second-feet); minimum flow occurs during winter months when small amount of water is run for stock.

Winter flow.—No records obtained; small amount of water run for stock.

Diversions.—No diversions above station and none for several miles below.

Regulation.—Flow regulated at head gates 500 feet above.

Accuracy.—Stage-discharge relation permanent. Rating curve well defined between 50 and 300 second-feet. Gage read to half tenths twice daily. Discharge determined by applying mean daily gage heights to rating table. Results good.

Fort Hall upper canal diverts from the left bank of Blackfoot River in sec. 12, T. 3 S., R. 35 E. Water is used for irrigation on Fort Hall Indian Reservation.

Discharge measurements of Fort Hall upper canal near Blackfoot, Idaho, during the year ending Sept. 30, 1915.

Date.	Made by—	Gage height.	Discharge.	Date.	Made by—	Gage height.	Discharge.
		Feet.	*Sec.-ft.*			*Feet.*	*Sec.-ft.*
Apr. 21	G. C. Baldwin.......	2.59	146	Aug. 3	G. C. Baldwin.......	3.27	222
May 26	A. W. Harrington....	2.49	138	Sept. 22	A. W. Harrington....	2.03	88.[illegible]

Daily discharge, in second-feet, of Fort Hall upper canal near Blackfoot, Idaho, for the year ending Sept. 30, 1915.

Day.	Oct.	Apr.	May.	June.	July.	Aug.	Sept.
1	84	....	190	131	329	245	168
2	86	....	201	131	329	223	168
3	86	....	201	136	329	223	168
4	96	....	190	136	329	223	168
5	106	....	190	146	341	223	168
6	106	....	190	131	341	223	157
7	106	....	190	86	341	201	157
8	106	....	190	116	341	201	146
9	111	....	190	157	341	201	126
10	111	....	201	201	341	201	126
11	101	....	190	190	341	201	126
12	101	....	201	190	341	201	126
13	101	....	190	190	341	201	126
14	101	10	157	179	329	201	106
15	96	42	126	190	329	201	101
16	68	66	126	168	329	201	96
17	11	79	157	190	341	201	96
18	2.5	101	168	234	329	201	96
19	2.5	136	168	234	329	179	96
20	2.5	136	157	269	329	179	96
21	2.5	146	126	293	329	179	96
22	2.5	136	136	293	329	179	91
23	2.5	168	136	305	329	179	96
24	2.5	168	136	305	341	168	96
25	2.5	168	136	305	341	168	91
26	2.5	146	136	317	341	168	91
27	2.5	157	136	329	317	168	91
28	2.5	168	136	329	293	168	96
29	2.5	157	136	329	293	168	96
30	2.5	157	131	317	281	168	96
31	2.5	....	131	....	245	168	....

Note.—Canal head gates closed Nov. 1 to Apr. 13; practically no water flowing.

Monthly discharge of Fort Hall upper canal near Blackfoot, Idaho, for the year ending Sept. 30, 1915.

Month.	Discharge in second-feet.			Run-off (total in acre-feet).	Accuracy.
	Maximum.	Minimum.	Mean.		
October	111	2.5	52.0	3,200	B.
April 14–30	168	10	126	4,250	B.
May	201	126	163	10,000	A.
June	329	86	218	13,000	A.
July	341	245	327	20,100	A.
August	245	168	194	11,900	A.
September	168	91	119	7,080	A.

FORT HALL LOWER CANAL NEAR BLACKFOOT, IDAHO.

Location.—In sec. 15, T. 3 S., R. 35 E., Bingham County, 200 feet below ford where road to head gates half a mile above crosses canal and about 2½ miles southeast of Blackfoot.

Records available.—May 15, 1912, to September 30, 1915.

Gage.—Inclined staff on right bank near center of concrete rating section; read by the ditch rider for the United States Indian Service. Bristol water-stage recorder at same site but at datum 1.53 feet lower than that of staff gage was used from 1912 to 1914.

Discharge measurements.—Made from suspension footbridge at gage.

Channel and control.—Channel at gage is trapezoidal concrete rating section at sides of which mud and silt have been deposited. Principal control is a wooden check across the canal about a third of a mile below gage; this control remained unchanged from April 20 to September 30, 1915, but variations in the amount of water carried in a large lateral that diverts between the gage and the check and the growth of moss and weeds in the canal caused several changes in the stage-discharge relation during the season.

Extremes of discharge.—1912–1915; maximum stage recorded, 1.70 feet July 14, 1915 (discharge, 156 second-feet), corresponding to about 3.23 feet on old gage; canal reported dry on many dates.

Winter flow.—No winter records obtained. Small quantities of water are run at times for use of stock but during most of the winter the head gates are closed.

Diversions.—None above gage; a large lateral diverts water about a quarter of a mile below gage, and one small ditch diverts between the gage and the check that acts as the main control.

Regulation.—Flow regulated at head gates half a mile above gage.

Accuracy.—Stage-discharge relation not permanent; affected by variation in quantity of water diverted by large lateral below gage and by growth of moss and weeds in canal. Rating curves fairly well defined; applicable as follows: October 1–10; April 20–30; and August 3 to September 30; May 23 to July 11. Gage read to tenths or half tenths twice daily. Daily discharge ascertained by applying daily gage heights to rating tables; shifting-control method used May 1–22 and July 12 to August 2. Records fair.

Fort Hall lower canal diverts from left bank of Blackfoot River in sec. 11, T. 3 S., R. 35 E. Water is used for irrigation on Fort Hall Indian reservation.

Discharge measurements of Fort Hall lower canal near Blackfoot, Idaho, during the year ending Sept. 30, 1915.

Date.	Made by—	Gage height.	Discharge.	Date.	Made by—	Gage height.	Discharge.
		Feet.	*Sec.-ft.*			*Feet.*	*Sec.-ft.*
Apr. 21	G. C. Baldwin	0.29	16.5	July 11	G. C. Baldwin	1.68	154
May 26	A. W. Harrington	.64	53.6	Aug. 3	.....do	1.03	77.4
26	.....do	.46	40.3	Sept. 22	A. W. Harrington	.54	36.0
June 11	.....do	.59	50.2	22	.....do	1.14	90.1
11	.....do	.84	75.3				

Daily discharge, in second-feet, of Fort Hall lower canal near Blackfoot, Idaho, for the year ending Sept. 30, 1915.

Day.	Oct.	Apr.	May.	June.	July.	Aug.	Sept.
1	16	....	33	41	138	111	44
2	17	....	37	42	138	111	44
3	18	....	38	45	138	76	44
4	18	....	38	46	138	53	44
5	20	....	20	48	138	53	44
6	23	....	28	56	138	53	47
7	25	....	39	60	138	53	44
8	32	....	40	60	138	58	36
9	34	....	43	56	148	55	28
10	32	....	52	59	148	44	28
11	....	....	61	61	154	44	28
12	....	....	64	73	147	44	28
13	....	....	64	53	147	50	28
14	....	....	51	41	157	66	28
15	....	....	38	49	146	66	28
16	....	....	41	47	145	67	28
17	....	....	40	49	130	63	28
18	....	....	36	60	124	67	28
19	....	....	43	51	118	71	28
20	....	9	48	56	123	71	28
21	....	17	50	28	117	71	28
22	....	18	52	69	117	71	44
23	....	20	56	86	116	74	32
24	....	21	56	93	116	80	32
25	....	23	56	113	125	66	32
26	....	24	49	133	125	58	32
27	....	32	38	138	124	58	32
28	....	28	38	138	123	54	32
29	....	32	38	138	123	53	32
30	....	32	38	138	122	58	32
31	....	....	38	....	116	50	....

NOTE.—No record obtained Oct. 11 to Apr. 19; head gates closed most of the time. Discharge interpolated Apr. 22–25.

Monthly discharge of Fort Hall lower canal near Blackfoot, Idaho, for the year ending Sept. 30, 1915.

Month.	Discharge in second-feet.			Run-off (total in acre-feet).	Accuracy
	Maximum.	Minimum.	Mean.		
October 1–10	34	16	23.5	466	D.
April 20–30	32	9	23.3	508	C.
May	64	20	44.0	2,710	C.
June	138	28	70.9	4,220	C.
July	154	116	133	8,180	B.
August	111	44	63.8	3,920	B.
September	47	28	33.7	2,010	B.

BIG LOST RIVER NEAR CHILLY, IDAHO.

Location.—In sec. 30, T. 8 N., R. 21 E., at Howell's ranch, 12 miles southwest of Chilly, Custer County, and 30 miles above Mackay. Thousand Springs Creek and Warm Springs Creek are the principal tributaries that enter Big Lost River between the station and Mackay.

Drainage area.—Not measured.

Records available.—April 25, 1904, to August 31, 1906; July 1, 1907, to November 14, 1914, when the station was discontinued.

Gage.—Vertical staff on left bank near Howell's tool house; read by Mrs. John Howell. Prior to June 7, 1912, several gages differing slightly in location and datum.

Discharge measurements.—Made from cable half a mile below gage.

Channel and control.—Bed composed of coarse gravel; control fairly permanent.

Extremes of discharge.—Maximum stage recorded during October and November, 1914, 4.24 feet, October 1, 2, and 3 (discharge, 233 second-feet); minimum stage recorded, 4.09 feet, October 13–17, October 31 to November 2, and November 12–14 (discharge, 179 second-feet).

1904–1914: Maximum stage recorded, 6.28 feet, June 20, 1911 (discharge, 3,420 second-feet); minimum stage recorded, 3.35 feet, April 1, 1912 (discharge, 27 second-feet).

Winter flow.—Stage discharge relation seriously affected by ice; observations discontinued during winter.

Diversions.—None above station.

Regulation.—None.

Accuracy.—Rating curve fairly well defined. Gage read to hundredths twice daily. Records good.

Daily discharge, in second-feet, of Big Lost River near Chilly, Idaho, for the period Oct. 1 to Nov. 14, 1914.

Day.	Oct.	Nov.	Day.	Oct.	Nov.	Day.	Oct.	Nov.
1	233	179	11	196	196	21	233	....
2	233	179	12	196	179	22	214	....
3	233	196	13	179	179	23	196	....
4	225	196	14	179	179	24	196	....
5	214	196	15	179	....	25	196	....
6	203	196	16	179	....	26	196	....
7	196	196	17	179	....	27	196	....
8	196	196	18	214	....	28	196	....
9	196	196	19	233	....	29	196	....
10	196	196	20	233	....	30	189	....
						31	179	....

Monthly discharge of Big Lost River near Chilly, Idaho, for the period Oct. 1 to Nov. 14, 1914.

Month.	Discharge in second-feet.			Run-off (total in acre-feet).	Accuracy.
	Maximum.	Minimum.	Mean.		
October	233	179	203	12,500	B.
November 1-14	196	179	190	5,280	B.
The period	....	....	....	17,800	

BIG LOST RIVER NEAR MACKAY, IDAHO.

Location.—In sec. 17, T. 7 N., R. 24 E., at A. D. Streeter's ranch, about 2 miles above the village of Mackay, Custer County, and about 2½ miles below the partly constructed Mackay dam.

Drainage area.—Not measured.

Records available.—November 12, 1903, to September 1, 1906; May 12, 1912, to March 15, 1915, when station was discontinued.

Gage.—Vertical staff on left bank, one-fourth mile from Streeter's house, installed April 29, 1913; read by A. D. Streeter. A vertical staff gage installed June 6 1912, at the Olsen suspension bridge, about a mile above present gage, was in use until April 28, 1913. Streeter ditch diverts water between the old and new stations.

Discharge measurements.—Made by wading or from cable just below the Olsen bridge. The flow in Streeter ditch must be deducted in order to obtain the flow of the river past the gage.

Channel and control.—Rocky; fairly permanent.

Extremes of discharge.—Maximum stage recorded during year, 1.65 feet October 21 to 25 (discharge, 308 second-feet); minimum stage recorded, 1.24 feet February 21 to March 15 (discharge, 196 second-feet).

1903–1915: Maximum stage recorded, 5.4 feet at 9.30 a. m., June 4, 1914 (discharge, 1,880 second-feet); minimum stage recorded, 0.36 foot March 26–28, 1914 (discharge, 41 second-feet).

Winter flow.—Stage-discharge relation unaffected by ice; open-channel rating assumed applicable.

Diversions.—Numerous diversions are made from the river above the gage. Sharp ditch and Streeter ditch divert water between the gage and the dam.

Regulation.—None, though the flow past the gage may be regulated by the gates at the Mackay dam when that structure is completed.

Accuracy.—Rating curve well defined below 1,000 second-feet but not verified by discharge measurements since July 28, 1914. Gage read to half-tenths once daily. Records fair.

Daily discharge, in second-feet, of Big Lost River near Mackay, Idaho, for the year ending Sept. 30, 1915.

Day.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Day.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.
1	264	293	236	209	196	196	16	293	293	209	209	196	......
2	264	293	236	209	196	196	17	293	293	209	209	196	......
3	264	293	222	209	196	196	18	293	278	209	209	196	......
4	278	293	222	209	196	196	19	293	278	209	209	196	......
5	278	293	222	209	196	196	20	293	264	209	209	196	......
6	278	308	222	209	196	196	21	308	250	209	209	196	......
7	293	308	222	209	196	196	22	308	250	209	209	196	......
8	293	308	222	209	196	196	23	308	250	209	209	196	......
9	293	308	222	209	196	196	24	308	236	209	209	196	......
10	293	293	222	209	196	196	25	308	236	209	209	196	......
11	293	293	222	209	196	196	26	308	236	209	209	196	......
12	293	293	222	209	196	196	27	308	236	209	196	196	......
13	293	293	222	209	196	196	28	293	236	209	196	196	......
14	293	293	222	209	196	196	29	293	236	209	196	......	......
15	293	293	209	209	196	196	30	293	236	209	196	......	......
							31	293	......	209	196	......	......

Monthly discharge of Big Lost River near Mackay, Idaho, for the year ending Sept. 30, 1915.

Month.	Discharge in second-feet.			Run-off (total in acre-feet).	Accuracy.
	Maximum.	Minimum.	Mean.		
October	308	264	292	18,000	B.
November	308	236	275	16,400	B.
December	236	209	216	13,300	C.
January	209	196	207	12,700	C.
February	196	196	196	10,900	C.
March 1-15	196	196	196	5,830	C.
The period				77,100	

SHARP DITCH NEAR MACKAY, IDAHO.

LOCATION.—In sec. 12, T. 27 N., R. 23 E., 250 feet below head of ditch, half a mile below the Mackay dam, and 3½ miles northwest of Mackay, Custer County.

RECORDS AVAILABLE.—June 6, 1912, to October 24, 1914, when station was discontinued.

GAGE.—Vertical staff on left bank; installed June 26, 1913; read by F. McIntosh. Original gage was vertical staff attached to inside of rating flume, on left side, 40 feet below head gates and 200 feet above site of present gage. Relation between present and original gage not determined.

DISCHARGE MEASUREMENTS.—Made by wading or from footbridge 100 feet below gage.

CHANNEL AND CONTROL.—Control consists of gravel and sand and is poorly defined. Stage-discharge relation affected at times by backwater from moss and weeds in channel.

EXTREMES OF DISCHARGE.—Maximum stage recorded during October, 6.55 feet October 1-2, 12, and 14 (discharge, 9.5 second-feet); minimum stage recorded, 6.3 feet October 7 and 8 (discharge, 5.3 second-feet).

1912-1914: Maximum discharge recorded, 38 second-feet June 24, 1912 (corresponding to 6.9 feet on original gage); minimum discharge recorded, 1 second-foot June 10, 1913 (corresponding to 5.2 feet on original gage); accuracy of recorded minimum doubtful on account of unstable condition of gage. Ditch reported practically dry May 1-7, 1913.

WINTER FLOW.—Presumably derived from leakage through head gates; no winter records.

DIVERSIONS.—Station is above all points of diversion for irrigation, but there is a small wasteway above the present gage.

REGULATION.—Flow controlled by head gates and by small wasteway above gage.

ACCURACY.—Records poor; applicability of rating curve not closely defined by discharge measurements.

Sharp ditch diverts water from east side of Big Lost River in sec. 12, T. 7 N., R. 23 E., a mile above heading of Streeter ditch and half a mile below Mackay dam. The water is used for irrigation on land northwest of Mackay and above Streeter ditch.

Daily discharge, in second-feet, of Sharp ditch near Mackay, Idaho, for the period Oct. 1–24, 1914.

Day.	Oct.	Day.	Oct.	Day.	Oct.
1	9.5	11	7.8	21	8.9
2	9.5	12	9.5	22	8.9
3	8.9	13	9.5	23	8.9
4	7.4	14	9.5	24	8.9
5	6.0	15	9.2		
6	5.6	16	8.9		
7	5.3	17	8.9		
8	5.3	18	8.7		
9	6.0	19	8.5		
10	6.0	20	8.7		

NOTE.—Mean discharge Oct. 1-24, 8.1 second-feet. Total run-off, 385 acre-feet.

STREETER DITCH NEAR MACKAY, IDAHO.

LOCATION.—In sec. 17, T. 7 N., R. 24 E., at A. D. Streeter's ranch, three-fourths mile below head of ditch and 2 miles northwest of Mackay, Custer County.

RECORDS AVAILABLE.—May 16, 1913, to November 20, 1914, when station was discontinued.

GAGE.—Vertical staff; read by A. D. Streeter.

DISCHARGE MEASUREMENTS.—Made by wading or from a bridge 10 feet below gage.

CHANNEL AND CONTROL.—Control indefinite. Stage-discharge relation at times affected by backwater from moss and weeds.

EXTREMES OF DISCHARGE.—Maximum stage recorded October-November, 2.50 feet October 29 and 30 (discharge, 18 second-feet); minimum stage recorded, 1.40 feet November 7–20 (discharge, 0.5 second-foot).

1913–1914: Maximum stage recorded, 2.8 feet June 11, 1913 (discharge, 42 second-feet); ditch reported practically dry December 6–31, 1913.

WINTER FLOW.—Not recorded. Head gates are closed during winter, but there is a small amount of leakage and the ditch receives also water from a small spring.

DIVERSIONS.—None from ditch above gage.

REGULATION.—Flow regulated by head gates at point of diversion from Big Lost River.

ACCURACY—Records poor, as applicability of rating curve is not definitely established by discharge measurements.

Streeter ditch diverts water from the east side of Big Lost River in sec. 18, T. 7 N., R. 24 E., about 3 miles above Mackay. The water is used for irrigation by several ranches northwest of Mackay.

Daily discharge, in second-feet, of Streeter ditch near Mackay, Idaho, for the period Oct. 1 to Nov. 20, 1914.

Day.	Oct.	Nov.	Day.	Oct.	Nov.	Day.	Oct.	Nov.
1	1.0	17	11	.7	.5	21	.8	....
2	1.0	17	12	.7	.5	22	.8	....
3	1.0	17	13	.7	.5	23	.8	....
4	0.9	17	14	.7	.5	24	.8	....
5	.9	17	15	.7	.5	25	.8	....
6	.9	0.8	16	.8	.5	26	.8	....
7	.9	.5	17	.8	.5	27	.8	....
8	.7	.5	18	.8	.5	28	17	....
9	.7	.5	19	.8	.5	29	18	....
10	.7	.5	20	.8	.5	30	18	....
						31	17	....

Monthly discharge of Streeter ditch near Mackay, Idaho, for the period Oct. 1 to Nov. 20, 1914.

Month.	Discharge in second-feet.			Run-off (total in acre-feet).	Accuracy.
	Maximum.	Minimum.	Mean.		
October	18	0.7	2.96	182	D.
November 1-20	17	.5	4.64	184	D.
The period				366	

ANTELOPE CREEK NEAR DARLINGTON, IDAHO.

Location.—In sec. 29 (approximately), T. 5 N., R. 25 E., at the John G. Richardson ranch, 6 miles west of Moore, 8 miles southwest of Darlington, Blaine County, and 12 miles above mouth of creek.

Drainage area.—Not measured.

Records available.—April 29, 1913, to September 30, 1915.

Gage.—Inclined staff with vertical high-water section on left bank, 150 yards above Richardson's house; read by John G. Richardson.

Discharge measurements.—Made by wading or from cable 300 feet below gage.

Channel and control.—Bed composed of gravel. One channel at all stages though high water may overflow banks. Control changes each year with the spring break-up.

Extremes of discharge.—Maximum stage recorded during year, 3.05 feet June 1 and 2 (discharge, 192 second-feet) minimum stage recorded, 1.06 feet August 4, 6, 7, and 9 (discharge, 3 second-feet).

1913–1915: Maximum stage recorded, 4.4 feet May 28, 1913 (discharge, 581 second-feet); minimum stage recorded August 4, 6, 7, and 9, 1915. Stages exceeding 4.4 feet may have occurred during winter months, but stage-discharge relation was seriously affected by ice.

Winter flow.—Stage-discharge relation seriously affected by ice; observations discontinued during winter.

Diversions.—Small ditches divert water for ranch irrigation from Antelope Creek and its tributaries above gage; quantity diverted not known.

Regulation.—None. Abrupt changes indicated by the daily-discharge record may possibly be due to diversions a short distance above gage.

Accuracy.—Stage-discharge relation not permanent; affected by ice during winter. Two fairly well defined rating curves used, one applicable October 1 to November 23, the other April 4 to December 30. Gage read to hundredths twice daily. Daily discharge ascertained by applying daily gage heights to rating table. Records fair.

Discharge measurements of Antelope Creek near Darlington, Idaho, during the year ending Sept. 30, 1915.

[Made by G. C. Baldwin.]

Date.	Gage height.	Discharge.
	Feet.	*Sec.-ft.*
July 13	1.88	38.7
14	1.86	36.1

Daily discharge, in second-feet, of Antelope Creek near Darlington, Idaho, for the year ending Sept. 30, 1915.

Day.	Oct.	Nov.	Apr.	May.	June.	July.	Aug.	Sept.
1	26	34	....	148	192	37	7	11
2	27	33	....	156	192	45	5	11
3	33	32	....	156	165	45	5	11
4	36	33	53	140	140	45	3	14
5	37	33	53	124	124	55	3	14
6	35	33	45	110	124	67	3	14
7	34	32	53	84	124	84	3	14
8	31	32	53	84	140	78	3	14
9	27	29	53	72	156	61	3	17
10	30	29	53	84	140	53	14	18
11	32	29	53	96	124	53	14	22
12	33	30	63	96	110	53	14	28
13	33	31	72	124	108	37	14	34
14	30	32	78	132	90	37	14	34
15	29	33	78	124	84	37	16	34
16	27	33	96	132	72	34	17	31
17	27	32	110	148	72	30	14	30
18	27	31	110	165	78	30	13	30
19	30	30	103	174	96	28	14	27
20	33	33	110	140	84	24	17	27
21	36	26	132	148	72	22	17	24
22	39	11	124	140	72	21	14	21
23	41	20	117	140	78	18	14	21
24	37	....	110	148	78	18	14	21
25	35	....	96	156	72	24	14	21
26	35	....	96	148	72	21	14	34
27	37	....	96	140	68	18	14	37
28	38	....	124	148	63	11	14	35
29	36	....	140	156	43	11	14	30
30	36	....	140	165	37	11	13	30
31	35	....	....	174	....	11	11	....

NOTE.—Stage-discharge relation affected by ice Nov. 24 to Dec. 8. No record obtained Dec. 9 to Apr. 3. Mean discharge Nov. 24–30 estimated at 20 second-feet.

Monthly discharge of Antelope Creek near Darlington, Idaho, for the year ending Sept. 30, 1915.

Month.	Discharge in second-feet.			Run-off (total in acre-feet).	Accuracy.
	Maximum.	Minimum.	Mean.		
October	41	26	33.0	2,030	B.
November	34	11	27.7	1,650	C.
April 4–30	140	45	89.3	4,780	B.
May	174	72	134	8,240	B.
June	192	37	102	6,070	B.
July	84	11	36.1	2,220	B.
August	17	3	11.3	695	D.
September	37	11	23.6	1,400	C.

PORTNEUF RIVER BELOW RESERVOIR, NEAR CHESTERFIELD, IDAHO.

LOCATION.—In sec. 30, T. 6 S., R. 39 E., one-fourth mile below dam of Portneuf-Marsh Valley Canal Co., and 2½ miles west of Chesterfield, Bannock County. Topons Creek enters Portneuf River 3 miles below.

DRAINAGE AREA.—Not measured.

RECORDS AVAILABLE.—May 23, 1912, to April 9, 1915, when station was discontinued.

GAGE.—Vertical staff on right bank, directly under the Hess-McGinnis flume, which carries the Portneuf diversion canal across the river; read about once a week by employees of the Portneuf-Marsh Valley Canal Co.

Discharge measurements.—Made by wading or from flume at gage.

Channel and control.—Bed consists of fine gravel. Stage-discharge relation seriously affected by moss in channel during summer. A wooden control, effective at low stages only, was installed July 27, 1912, about 6 feet below gage; a natural control farther downstream becomes effective at medium and high stages.

Extremes of discharge.—Maximum stage recorded October to April, 2.50 feet February 6, 13, and 20 and March 13 and 20 (discharge, 7.1 second-feet); minimum stage recorded, 2.30 feet January 23 (discharge, 1.5 second-feet).

1912–1915: Maximum stage recorded, 4.80 feet April 19–22, 1914 (discharge, 81 second-feet); minimum stage recorded January 23, 1915.

Winter flow.—Stage-discharge relation not affected by ice, probably because of proximity of station to reservoir. Open-channel rating curves assumed applicable.

Diversions.—The Portneuf diversion canal takes water from river just below reservoir, one-fourth mile above station; present capacity of reservoir about 28,000 acre-feet; supply from Portneuf River augmented by feeder canal from Topons Creek. Main canal diverts about 23 miles below station; numerous ranch diversions between dam and point of diversion of main canal.

Regulation.—Flow regulated by gates at dam and by diversion into Portneuf diversion canal.

Accuracy.—Stage-discharge relation not permanent. Two poorly defined rating curves used, one applicable October 1 to December 15, the other December 16 to April 9. Gage read once or twice a week. Discharge ascertained by applying daily gage heights to rating table and interpolating for days on which gage was not read. Records poor.

Daily discharge, in second-feet, of Portneuf River below reservoir, near Chesterfield, Idaho, for the year ending Sept. 30, 1915.

Day.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.
1	3.7	3.0	5.1	3.7	5.1	3.7	3.7
2	3.7	3.0	5.1	3.7	5.5	3.7	3.7
3	3.7	3.0	5.1	3.7	5.9	3.7	3.7
4	3.7	3.0	5.1	3.7	6.3	3.7	3.7
5	3.7	3.0	5.1	3.7	6.7	3.7	3.7
6	3.7	3.0	5.1	3.7	7.1	3.7	3.7
7	3.7	3.0	5.1	3.7	7.1	4.2	3.7
8	3.7	3.0	5.1	3.7	7.1	4.6	3.7
9	3.7	3.0	5.1	3.7	7.1	5.1	3.7
10	3.7	3.0	5.1	3.7	7.1	5.6	....
11	3.6	3.0	5.1	3.7	7.1	6.1	....
12	3.5	3.0	5.1	3.7	7.1	6.6	....
13	3.4	3.0	5.1	3.7	7.1	7.1	....
14	3.3	3.0	5.1	3.7	7.1	7.1	....
15	3.2	3.0	5.1	3.7	7.1	7.1	....
16	3.1	3.0	5.1	3.4	7.1	7.1	....
17	3.0	3.0	5.1	3.2	7.1	7.1	....
18	3.0	3.0	5.1	2.9	7.1	7.1	....
19	3.0	3.0	5.1	2.6	7.1	7.1	....
20	3.0	4.4	4.9	2.4	7.1	7.1	....
21	3.0	5.7	4.7	2.1	6.6	6.6	....
22	3.0	5.5	4.5	1.8	6.1	6.1	....
23	3.0	5.4	4.3	1.5	5.6	5.6	....
24	3.0	5.2	4.1	1.9	5.1	5.1	....
25	3.0	5.1	3.9	2.3	4.6	4.6	....
26	3.0	5.1	3.7	2.7	4.2	4.2	....
27	3.0	5.1	3.7	3.1	3.7	3.7	....
28	3.0	5.1	3.7	3.5	3.7	3.7	....
29	3.0	5.1	3.7	3.9	....	3.7	....
30	3.0	5.1	3.7	4.3	....	3.7	....
31	3.0	....	3.7	4.7	....	3.7	....

Monthly discharge of Portneuf River below reservoir, near Chesterfield, Idaho, for the year ending Sept. 30, 1915.

Month.	Discharge in second-feet.			Run-off (total in acre-feet).	Accuracy.
	Maximum.	Minimum.	Mean.		
October	3.7	3.0	3.29	202	C.
November	5.7	3.0	3.79	226	D.
December	5.1	3.7	4.69	288	D.
January	4.7	1.5	3.28	202	D.
February	7.1	3.7	6.27	348	D.
March	7.1	3.7	5.22	321	D.
April 1-9	3.7	3.7	3.70	66	D.
The period				1,650	

PORTNEUF RIVER AT TOPAZ, IDAHO.

Location.—In sec. 23, T. 9 S., R. 37 E., just below the Oregon Short Line Railroad bridge one-fourth mile west of Topaz flag station, Bannock County, 1¼ miles above diversion dam of the Portneuf-Marsh Valley Canal Co., and 6 miles southwest of McCammon.

Drainage area.—Not measured.

Records available.—January 12, 1913, to September 30, 1915, when station was discontinued.

Gage.—Vertical staff on left bank 100 feet below railroad bridge; read daily by employees of the Portneuf-Marsh Valley Canal Co.

Discharge measurements.—Made from downstream side of highway bridge half a mile above gage.

Channel and control.—Control is a loose rock riffle 500 feet below gage. Blasting operations in March, 1915, removed some of the rock forming this control and changed stage-discharge relation.

Extremes of discharge.—Maximum stage recorded during year, 3.55 feet October 1–3 (discharge, 276 second-feet); maximum discharge, 284 second-feet June 23 and 25 (corresponding to a gage height of 2.92 feet). Minimum stage recorded 1.98 feet August 27–29 and 31 (discharge, 127 second -feet).

1913–1915. Maximum stage recorded, 6.1 feet, April 3, 1913 (discharge, 902 second feet); minimum stage recorded August 27–29 and 31, 1915.

Winter flow.—No records obtained during winter of 1914–15.

Diversions.—Numerous ranch diversions are made above the station. The storage reservoir of the Portneuf-Marsh Valley Canal Co. (present capacity about 28,000 acre-feet) is near Chesterfield.

Regulation.—Flow during irrigation season regulated to large extent from the Portneuf-Marsh Valley reservoir.

Accuracy.—Stage-discharge relation not permanent. Two fairly well defined rating curves used, one applicable October 1–30 and the other June 8 to September 30. No records obtained November 1 to June 7. Daily discharge ascertained by applying daily gage heights to rating tables. Records good.

Cooperation.—Gage-height record furnished by the Portneuf-Marsh Valley Canal Co.

Discharge measurements of Portneuf River at Topaz, Idaho, during the year ending Sept. 30, 1915.

Date.	Made by—	Gage height.	Discharge.	Date.	Made by—	Gage height.	Discharge.
		Feet.	*Sec.-ft.*			*Feet.*	*Sec.-ft.*
Nov. 7	L. W. Roush	3.04	182	July 28	G. C. Baldwin	2.57	222
Apr. 28	G. C. Baldwin	2.80	262	Sept. 25	A. W. Harrington	2.17	150
June 8	A. W. Harrington	2.42	199				

Daily discharge, in second-feet, of Portneuf River at Topaz, Idaho, for the year ending Sept. 30, 1915.

Day.	Oct.	June.	July.	Aug.	Sept.	Day.	Oct.	June.	July.	Aug.	Sept.
1	285	....	262	193	130	16	211	262	244	138	153
2	285	....	262	193	138	17	211	262	244	138	153
3	285	....	262	185	145	18	194	280	244	130	161
4	211	....	244	177	145	19	194	280	262	130	161
5	211	....	244	169	145	20	194	280	244	138	153
6	211	....	262	161	145	21	194	280	244	138	145
7	211	....	262	153	138	22	194	280	227	130	138
8	211	202	244	145	130	23	194	280	244	130	138
9	211	210	262	145	130	24	194	280	227	130	138
10	211	262	262	145	130	25	194	280	227	130	161
11	211	227	244	145	145	26	194	280	227	130	193
12	211	262	262	145	138	27	194	280	227	130	210
13	211	280	262	138	138	28	194	280	227	130	193
14	211	262	262	138	153	29	194	262	210	130	161
15	211	262	262	138	161	30	194	262	202	130	161
						31	194	....	193	130	....

Monthly discharge of Portneuf River at Topaz, Idaho, for the year ending Sept. 30, 1915.

Month.	Discharge in second-feet.			Run-off (total in acre-feet).	Accuracy.
	Maximum.	Minimum.	Mean.		
October	285	194	210	12,900	B.
June 8–30	280	202	265	12,100	B.
July	262	193	244	15,000	B.
August	193	130	145	8,920	B.
September	210	130	151	8,980	B.

PORTNEUF RIVER AT POCATELLO, IDAHO.

Location.—In sec. 27, T. 6 S., R. 34 E., about 20 feet above old slaughterhouse bridge at foot of Carson Street, in west end of Pocatello, Bannock County.

Drainage area.—Not measured.

Records available.—August 31, 1911, to September 30, 1915. For station about a mile upstream, May 18, 1897, to October 14, 1899.

Gage.—Vertical staff on left bank just below highway bridge constructed in 1914; read by W. S. Hutson. The gage in use 1897–1899 was a vertical staff spiked to pier of wagon bridge one-eighth mile below plant of Pocatello Electric Light Co.

Discharge measurements.—Made by wading or from upstream side of old slaughterhouse bridge.

Channel and control.—Bed of stream at gage and measuring section consists of rocks and medium sized boulders; very rough. One channel at all stages. Control fairly permanent, although it shifts within well-defined limits.

Extremes of discharge.—Maximum stage recorded during year, 4.4 feet at 1 p. m. April 23 and 24 (discharge, 473 second-feet); minimum stage recorded, 2.0 feet at 1 p. m. July 4 (discharge, 52 second-feet).

1911–1915: Maximum stage recorded, 6.4 feet May 23 and 24, 1912 (discharge, 1,240 second-feet); minimum stage recorded July 4, 1915.

1897–1899: Maximum stage recorded, 12.80 feet May 18, 1897 (discharge, 1,880 second-feet): minimum stage recorded, 6.10 feet July 4–11, 13, and 17–18, 1898 (discharge, 14 second-feet).

Winter flow.—Stage-discharge relation seriously affected by ice; flow estimated chiefly from observer's notes, which are fairly complete.

DIVERSIONS.—Numerous ranch diversions are made above the gage. The largest single diversion is that made by the canal of the Portneuf-Marsh Valley Canal Co., which diverts water for use in irrigating lands in the vicinity of Downey.

REGULATION.—None below the head of the Portneuf-Marsh Valley Canal Co.'s canal. The storage reservoir of this company is near Chesterfield and has a capacity of about 28,000 acre-feet.

ACCURACY.—Stage-discharge relation not permanent; affected by ice December 15 to January 17, January 19–22, and January 26 to February 2. Two well-defined rating curves used, one applicable October 1 to December 14 and the other during open-water period in 1915. Daily discharge ascertained by applying daily gage heights to rating table. Open-water records good except those for fall of 1914.

Discharge measurements of Portneuf River at Pocatello, Idaho, during the year ending Sept. 30, 1915.

Date.	Made by—	Gage height.	Dis-charge.	Date.	Made by—	Gage height.	Dis-charge.
		Feet.	*Sec.-ft.*			*Feet.*	*Sec.-ft.*
Apr. 29	G. C. Baldwin	3.98	371	July 28	G. C. Baldwin	2.23	70.8
June 9	A. W. Harrington	2.79	139	Sept. 24	A. W. Harrington	2.51	103

Daily discharge, in second-feet, of Portneuf River at Pocatello, Idaho, for the year ending Sept. 30, 1915.

Day.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.
1	288	308	308	......	300	349	371	349	228	55	68	78
2	308	308	308	......	300	327	349	349	210	55	68	83
3	308	308	308	......	306	327	371	327	192	52	68	89
4	329	308	308	......	306	327	371	327	183	52	68	89
5	351	308	308	......	286	327	420	306	183	59	68	95
6	398	308	308	......	257	327	420	286	166	64	64	101
7	398	308	308	......	286	327	420	266	158	68	64	101
8	398	308	329	......	286	327	420	228	150	73	64	101
9	398	308	308	......	286	327	420	192	142	78	64	101
10	398	308	308	......	286	327	420	166	127	89	64	101
11	398	308	308	......	286	327	395	166	134	89	68	101
12	398	308	308	......	286	327	371	166	142	89	68	101
13	398	308	308	......	286	349	371	158	142	89	68	101
14	398	308	268	......	286	371	395	150	134	83	68	101
15	374	308	......	......	306	371	420	142	134	83	68	107
16	351	308	......	......	306	395	420	134	134	78	68	107
17	351	308	......	......	327	420	420	127	127	78	68	113
18	351	308	......	228	349	473	420	120	120	78	64	113
19	374	308	......	......	371	420	420	120	113	78	64	113
20	374	308	......	......	371	395	420	175	......	142	59	113
21	351	308	......	......	349	371	420	192	......	142	59	113
22	351	308	......	......	349	371	446	210	......	127	59	113
23	351	308	......	210	349	371	473	210	......	101	68	113
24	329	308	......	247	349	371	473	228	......	64	83	101
25	329	308	......	266	349	371	446	247	......	64	78	101
26	329	308	......	......	349	371	420	247	......	64	78	158
27	329	308	......	......	349	371	395	247	......	64	78	192
28	329	308	......	......	349	371	371	247	......	68	78	201
29	329	308	......	......	......	371	371	247	......	68	73	192
30	308	308	......	......	......	371	371	247	......	68	73	183
31	308	......	......	......	......	371	......	247	......	68	78	......

NOTE.—Observer absent June 20 to July 22; mean discharge June 20–30 estimated at 85 second-feet. July 1–22 as in table. Mean discharge estimated, because of ice, from observer's notes and weather records as follows: Dec. 15 to Jan. 17, 230 second-feet; Jan. 19–22, 220 second-feet; Jan. 26–31, 290 second-feet; Feb. 1 and 2, 300 second-feet.

Monthly discharge of Portneuf River at Pocatello, Idaho, for the year ending Sept. 30, 1915.

Month.	Discharge in second-feet.			Run-off (total in acre-feet).	Accuracy.
	Maximum.	Minimum.	Mean.		
October	398	288	354	21,800	B.
November	308	306	308	18,300	C.
December	329	....	265	16,300	D.
January	....	....	241	14,800	D.
February	371	257	317	17,600	C.
March	473	327	362	22,300	B.
April	473	349	407	24,200	A.
May	349	120	220	13,500	A.
June	228	....	128	7,620	C.
July	142	52	78.4	4,820	A.
August	83	59	68.6	4,220	A.
September	201	78	116	6,900	A.
The year	473	52	238	172,000	

See footnote to table of daily discharge.

TOPONS CREEK NEAR CHESTERFIELD, IDAHO.

Location.—In sec. 34, T. 6 S., R. 38 E., at the Butterfield ranch, half a mile below head of diversion canal into the Portneuf-Marsh Valley reservoir and 7 miles west of Chesterfield, Bannock County.

Drainage area.—Not measured.

Records available.—April 25, 1912, to November 6, 1914, when station was discontinued.

Gage.—Vertical staff on right bank, back of Butterfield's barn and about 100 yards downstream.

Discharge measurements.—Made by wading.

Channel and control.—Bed rocky. Channel likely to be partly clogged at times by drift and fallen trees.

Winter flow.—Stage-discharge relation greatly affected by ice.

Extremes of discharge.—1912-1915: Maximum stage recorded, 8.0 feet May 21, 1912 (discharge, 355 second-feet); minimum discharge probably occurred during winter months.

Diversions and storage.—A few small ditches take out above and below station, but the main diversion, at least in flood period, is into the Portneuf-Marsh Valley reservoir on Portneuf River by means of a feeder canal heading about half a mile above the gage.

Accuracy.—Stage-discharge relation not permanent. No discharge measurements made after September 18, 1914. Rating curve poorly defined. Gage read twice a week. Daily discharge ascertained by applying daily gage heights to rating table and interpolating for days of missing gage heights. Records poor.

Daily discharge, in second-feet, of Topons Creek near Chesterfield, Idaho, for the year ending Sept. 30, 1915.

Day.	Oct.	Nov.	Day.	Oct.	Nov.	Day.	Oct.	Nov.
1	8	9	11	9	....	21	8	....
2	8	9	12	9	....	22	8	....
3	8	9	13	9	....	23	9	....
4	8	9	14	9	....	24	10	....
5	8	9	15	9	....	25	11	....
6	9	9	16	10	....	26	12	....
7	9	....	17	10	....	27	13	....
8	9	....	18	9	....	28	11	....
9	9	....	19	8	....	29	9	....
10	9	....	20	8	....	30	9	....
						31	9	....

Note.—Mean discharge for October, 9.2 second-feet; run-off, 566 acre-feet.

RAFT RIVER NEAR BRIDGE, IDAHO.

Location.—In sec. 7, T. 15 S., R. 27 E., one-fourth mile above the Olson ranch and 2 miles southwest of Bridge, Cassia County. Clear Creek enters Raft River below Bridge but surface flow from this stream seldom reaches the river.

Drainage area.—Not measured.

Records available.—September 18, 1909, to March 22, 1915, when station was discontinued

Gage.—Inclined staff on right bank; installed February 24, 1911; read by Andrew Olson. A supplementary gage is also installed about 1 mile southeast of the main gage in a slough which carries water at flood times unless dammed off. Prior to February 24, 1911, two different gages were used, at the Langford ranch, about 1¼ miles above site of present gage.

Discharge measurements.—Made by wading near the gage or from a bridge one-fourth mile downstream, at Olson's house.

Channel and control.—Bed of stream is of clay overlain with gravel, and may be expected to shift during flood period. The high water channel is dammed off and carried no water during the year ending September 30, 1915.

Extremes of discharge.—Maximum stage recorded during open water periods—October to March—3.55 feet November 30 and December 5 and 7 (discharge, 21 second-feet); minimum stage recorded, 3.25 feet March 21 and 22 (discharge, 10 second-feet).

1909–1915: Maximum stage recorded, 6.5 feet June 12, 1912 (discharge, 457 second-feet); does not represent actual maximum for period on account of breaks in the record. Minimum stage recorded, 2.8 feet August 15, 18, 21, 24, and 30, and September 2 and 4, 1911 (discharge, 1.5 second-feet).

Winter flow.—Stage-discharge relation greatly affected by ice; flow estimated from observer's notes and weather records.

Diversions.—Many small ranch diversions made above station.

Regulation.—None.

Accuracy.—Stage-discharge relation practically permanent; affected by ice November 15–27, December 1–4, and December 8 to February 19. Rating curve fairly well defined. Daily discharge ascertained by applying daily gage heights to rating table except for periods in which stage-discharge relation was affected by ice. Open-water records fair; winter records poor.

The following discharge measurements was made by L. W. Roush:

November 11, 1914: Gage height, 3.51 feet; discharge, 19.4 second-feet.

Daily discharge, in second-feet, of Raft River near Bridge, Idaho, for the year ending Sept. 30, 1915.

Day.	Oct.	Nov.	Dec.	Feb.	Mar.	Day.	Oct.	Nov.	Dec.	Feb.	Mar.
1	15	19	......	......	19	16	18	......	......	......	13
2	16	19	......	......	19	17	18	......	......	......	13
3	19	19	......	......	19	18	19	......	......	......	13
4	18	19	......	......	17	19	19	......	......	......	12
5	18	19	21	......	15	20	19	......	......	15	12
6	19	19	21	......	15	21	19	......	......	13	10
7	19	19	21	......	13	22	19	......	......	13	10
8	19	19	......	......	13	23	19	......	......	13	......
9	19	19	......	......	13	24	19	......	......	14	......
10	19	19	......	......	12	25	19	......	......	15	......
11	19	19	......	......	12	26	19	......	......	17	......
12	19	19	......	......	12	27	19	......	......	19	......
13	18	19	......	......	13	28	19	19	......	19	......
14	18	19	......	......	13	29	19	20	......	......	......
15	18	......	......	......	13	30	19	21	......	......	......
						31	19	......	......	......	......

Note.—Mean discharge estimated because of ice from observer's notes and weather records as follows: Nov. 15–27, 17 second-feet; Dec. 1–4, 21 second-feet; Dec. 8–31, 15 second-feet; Jan. 1 to Feb. 19, 11 second-feet. Discharge interpolated on account of missing gage heights, Nov. 29, Dec. 6, Feb. 22, 24, 26, Mar. 2, 4, 8, 11, 17, and 19.

Monthly discharge of Raft River near Bridge, Idaho, for the year ending Sept. 30, 1915.

Month.	Discharge in second-feet.			Run-off (total in acre-feet).	Accuracy.
	Maximum.	Minimum.	Mean.		
October	19	15	18.5	1,140	B.
November	21		18.2	1,080	C.
December	21		16.3	1,000	D.
January			11.0	676	D.
February	19		12.4	689	D.
March 1-22	19	10	13.7	597	C.
The period				5,180	

NOTE.—See footnote to table of daily discharge.

NORTH SIDE MINIDOKA CANAL NEAR MINIDOKA, IDAHO.

LOCATION.—In sec. 1, T. 9 S., R. 25 E., 650 feet below Minidoka dam, 6 miles south of Minidoka, Minidoka County.

RECORDS AVAILABLE.—May 1, 1909, to September 30, 1915.

GAGE.—Friez water-stage recorder on left bank, 300 feet below site of gage used prior to October 31, 1914.

DISCHARGE MEASUREMENTS.—Made from suspension footbridge a few feet above present gage.

CHANNEL AND CONTROL.—Rock cut; practically permanent but rough.

WINTER FLOW.—No records.

EXTREMES OF DISCHARGE.—Maximum stage recorded during year, 9.32 feet, July 5 (discharge, 1,493 second-feet); no flow from about noon September 18 to September 24 and also at times during period of no record.

1909-1915: Maximum stage recorded, 9.44, May 20, 1914 (discharge, 1,520 second-feet); no flow at various times when head gates were closed.

DIVERSIONS.—None above station and none close enough to affect stage-discharge relation.

REGULATION.—Flow controlled by head gates at Minidoka dam.

ACCURACY.—Stage-discharge relation permanent. Rating curve well defined. Records good.

COOPERATION.—Records furnished by United States Reclamation Service.

North Side Minidoka canal diverts from the right bank of Snake River in sec. 1, T. 9 S., R. 25 E. Water is used for irrigating the North Side Minidoka project of the United States Reclamation Service. Project has about 20 miles of main canal and about 260 miles of laterals.

Discharge measurements of North Side Minidoka canal near Minidoka, Idaho, during the year ending Sept. 30, 1915.

Date.	Made by—	Gage height.	Discharge.	Date.	Made by—	Gage height.	Discharge.
		Feet.	*Sec.-ft.*			*Feet.*	*Sec.-ft.*
Oct. 1	Aylor and Stearman..	6.50	794	June 4	M. Aylor	7.14	948
10	.....do...............	2.98	206	10	.....do...............	9.10	1,418
Jan. 29	L. W. Roush.........	3.25	154	16	.....do...............	9.16	1,451
Mar. 30	G. C. Baldwin.......	1.75	70.9	24	.....do...............	9.24	1,452
Apr. 1	M. Aylor.............	2.66	170	July 1	.....do...............	9.24	1,478
5	.....do...............	4.20	398	16	.....do...............	9.02	1,451
10	.....do...............	5.16	560	21	A. W. Harrington....	8.79	1,320
14	.....do...............	7.48	1,037	22	.....do...............	8.92	1,360
19	.....do...............	8.10	1,173	22	M. Aylor.............	8.92	1,376
23	.....do...............	9.12	1,458	26	.....do...............	9.20	1,412
30	.....do...............	6.15	729	Aug. 3	.....do...............	7.35	1,006
May 5	.....do...............	7.11	938	12	.....do...............	8.05	1,148
12	.....do...............	6.72	846	19	.....do...............	8.68	1,313
21	.....do...............	6.43	803	25	.....do...............	8.11	1,151
21	A. W. Harrington....	6.42	800	Sept. 1	.....do...............	7.78	1,086
27	M. Aylor.............	6.42	790				

NOTE.—All measurements except those made by Baldwin, Roush, and Harrington furnished by U. S. Reclamation Service.

Daily discharge, in second-feet, of North Side Minidoka canal near Minidoka, Idaho, for the year ending Sept. 30, 1915.

Day.	Oct.	Apr.	May.	June.	July.	Aug.	Sept.
1	792	149	741	903	1,465	1,077	1,092
2	783	173	778	928	1,462	1,006	1,084
3	570	221	921	939	1,470	988	1,0[illegible]
4	461	318	936	941	1,470	1,006	981
5	419	379	934	936	1,493	1,034	921
6	354	470	919	967	1,484	1,072	814
7	305	517	870	1,044	1,443	1,077	770
8	310	528	923	1,125	1,440	1,084	770
9	267	529	930	1,262	1,440	1,116	715
10	219	553	947	1,400	1,446	1,118	679
11	218	665	956	1,454	1,416	1,142	623
12	225	794	826	1,451	1,405	1,160	605
13	232	897	839	1,454	1,427	1,200	601
14	232	997	841	1,459	1,429	1,207	601
15	227	1,087	847	1,462	1,435	1,225	602
16	223	1,200	820	1,454	1,421	1,265	784
17	221	1,283	782	1,459	1,394	1,278	790
18	220	1,359	788	1,462	1,367	1,297	389
19	55	1,079	794	1,456	1,364	1,313	0
20	24	1,311	786	1,459	1,362	1,319	0
21	389	1,391	786	1,456	1,356	1,319	0
22	564	1,427	780	1,456	1,375	1,286	0
23	373	1,437	782	1,470	1,410	1,257	0
24	....	1,429	784	1,470	1,446	1,235	83
25	....	1,402	782	1,459	1,459	1,192	506
26	....	1,365	784	1,454	1,459	1,157	648
27	....	1,394	790	1,451	1,421	1,157	652
28	....	1,400	820	1,459	1,332	1,155	652
29	....	1,356	845	1,470	1,263	1,137	648
30	....	732	849	1,465	1,192	1,135	650
31	....	....	847	....	1,123	1,135	....

NOTE.—No record received Oct. 24 to Mar. 31, small amount of water flowing most of the period

Monthly discharge of North Side Minidoka canal near Minidoka, Idaho, for the year ending Sept. 30, 1915.

Month.	Discharge in second-feet.			Run-off (total in acre-feet).
	Maximum.	Minimum.	Mean.	
October 1-23	792	24	334	15,200
April	1,437	149	928	55,200
May	956	741	840	51,600
June	1,470	903	1,320	78,600
July	1,493	1,123	1,400	86,100
August	1,319	988	1,170	71,900
September	1,092	0	594	35,300

SOUTH SIDE MINIDOKA CANAL NEAR MINIDOKA, IDAHO.

Location.—In sec. 12, T. 9 S., R. 25 E., Cassia County, 300 yards below head gates at Minidoka dam, 6 miles south of Minidoka.

Records available.—April 21, 1909, to September 30, 1915.

Gage.—Friez water-stage recorder on right bank. Prior to irrigation season of 1910 gage was 200 or 300 feet upstream. Datum unchanged since spring of 1910.

Discharge measurements.—Made from suspension footbridge a few feet above gage.

Channel and control.—Canal section is in earth; may shift. Stage-discharge relation affected by growth of aquatic plants.

Winter flow.—No records.

Extremes of discharge.—1909–1915: Maximum stage recorded, 5.43 feet June 25, 1915 (discharge, 938 second-feet); probably no flow during periods of no record.

Diversions.—None above gage.

Regulation.—Flow controlled by head gates at Minidoka dam.

Accuracy.—Stage-discharge relation affected by growth of aquatic plants, but a large number of measurements were made and records are believed good.

Cooperation.—Records furnished by United States Reclamation Service.

South Side Minidoka canal diverts from the left bank of Snake River in sec. 1, T. 9 S., R. 25 E. Water is used for irrigating the South Side Minidoka project of the United States Reclamation Service. Project has about 13 miles of main canal and about 20 miles of laterals.

Discharge measurements of South Side Minidoka canal near Minidoka, Idaho, during the year ending Sept. 30, 1915.

Date.	Made by—	Gage height.	Discharge.	Date.	Made by—	Gage height.	Discharge.
		Feet.	*Sec.-ft.*			*Feet.*	*Sec.-ft.*
Oct. 10	M. Aylor	2.55	257	June 24	M. Aylor	5.48	956
Apr. 1	do	1.58	146	July 1	do	5.28	880
5	do	2.14	230	10	do	5.48	872
10	do	2.63	313	16	do	5.37	855
14	do	3.11	402	22	A. W. Harrington	5.43	888
19	do	3.90	565	22	M. Aylor	5.43	869
23	do	4.50	718	29	do	5.12	797
30	do	4.46	682	Aug. 3	do	4.90	760
May 5	do	3.01	381	12	do	5.00	773
12	do	3.32	438	19	do	5.08	794
21	A. W. Harrington	3.24	398	25	do	4.91	767
21	M. Aylor	3.22	411	Sept. 4	do	4.32	632
29	do	3.36	439	11	do	4.15	583
June 4	do	3.39	443	20	do	3.76	478
10	do	4.49	704	25	do	3.88	528
15	do	5.24	884				

Note.—All measurements except those made by A. W. Harrington furnished by U. S. Reclamation Service.

Daily discharge, in second-feet, of South Side Minidoka canal near Minidoka, Idaho, for the year ending Sept. 30, 1915.

Day.	Oct.	Apr.	May.	June.	July.	Aug.	Sept.
1	248	150	646	448	901	776	790
2	186	157	613	448	899	766	747
3	211	186	577	450	899	756	680
4	216	206	435	452	904	752	641
5	225	228	384	452	907	749	623
6	223	229	396	454	894	747	618
7	225	232	398	458	878	742	626
8	228	235	400	537	894	776	629
9	226	232	412	595	875	766	590
10	248	286	429	677	878	766	572
11	244	331	437	742	878	766	572
12	248	364	437	811	875	771	547
13	230	369	439	835	871	786	528
14	241	383	444	838	881	795	499
15	241	410	446	856	878	781	495
16	235	475	450	886	848	781	486
17	228	508	465	886	865	783	475
18	235	549	435	909	871	788	462
19	235	570	408	924	871	790	465
20	235	627	410	933	858	788	482
21	236	689	416	924	850	783	501
22	260	699	420	927	865	778	510
23	260	740	422	930	871	776	519
24	185	680	425	935	871	768	512
25	151	675	437	938	865	766	516
26	110	670	435	927	853	768	477
27	119	660	433	899	846	776	423
28	119	672	452	899	823	781	418
29	119	694	469	930	808	781	418
30	120	696	439	909	788	793	416
31	123	....	439	....	783	795	....

Note.—No record obtained Nov. 1 to Apr. 1.

Monthly discharge of South Side Minidoka canal near Minidoka, Idaho, for the year ending Sept. 30, 1915.

Month.	Discharge in second-feet.			Run-off (total in acre-feet).
	Maximum.	Minimum.	Mean.	
October	260	110	207	12,700
April	740	150	453	27,000
May	646	384	447	27,500
June	938	448	760	45,200
July	907	783	866	53,200
August	795	742	774	47,600
September	790	416	541	32,200

GOOSE CREEK ABOVE TRAPPER CREEK, NEAR OAKLEY, IDAHO.

Location.—In sec. 13, T. 15 S., R. 21 E., Cassia County, about 200 feet above upper dam site on Goose Creek, 5 miles above Trapper Creek, and 10 miles south of Oakley.

Drainage area.—Not measured.

Records available.—April 29, 1911, to September 30, 1915.

Gage.—Friez water-stage recorder on right bank. Gage used prior to flood of July 30, 1912, was on right bank about 200 feet farther downstream and at a different datum.

Discharge measurements.—Made by wading or from cable 250 feet upstream from gage.

Channel and control.—Bed rocky; shifts slightly. Banks high and not subject to overflow. Point of zero flow, according to measurements made July 31, 1915, gage height 0.9 foot.

Extremes of discharge.—Maximum stage during year, from water-stage recorder, 2.55 feet at 11 p. m. April 23 (discharge, 80 second-feet); minimum stage recorded, 1.19 feet at 9 a. m. August 13 (discharge, 1.1 second-feet).

1911–1915: Maximum stage recorded, 4.4 feet May 22, 1912 (discharge, 493 second-feet); minimum stage recorded August 13, 1915.

Winter flow.—Stage-discharge relation greatly affected by ice; observations discontinued during winter.

Diversions.—A number of small canals and ditches divert water above station chiefly for irrigation of lands belonging to the Utah Construction Co.

Regulation.—None except such as might be caused by changes of head gates of ditches and canals.

Accuracy.—Stage-discharge relation practically permanent. Rating curve fairly well defined. Operation of water-stage recorder not satisfactory and gage-height record unreliable at times. Mean daily gage heights obtained by inspecting recorder graph. Daily discharge ascertained by applying mean daily gage heights to rating table. Records for greater part of year fair, but at times are poor, chiefly because of unreliability of gage-height record.

Cooperation.—Gage-height record furnished by Twin Falls-Oakley Land & Water Co.

Discharge measurements of Goose Creek above Trapper Creek, near Oakley, Idaho, during the year ending Sept. 30, 1915.

Date.	Made by—	Gage height.	Discharge.	Date.	Made by—	Gage height.	Discharge.
		Feet.	*Sec.-ft.*			*Feet.*	*Sec.-ft.*
Nov. 13	L. W. Roush.........	2.11	30.7	July 31	A. W. Harrington....	1.35	2.6
May 6	G. C. Baldwin.......	2.48	65.8				

Daily discharge, in second-feet, of Goose Creek above Trapper Creek, near Oakley, Idaho, for the year ending Sept. 30, 1915.

Day.	Oct.	Nov.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.
1	17	23	....	61	65	67	12	3	6
2	17	23	....	59	76	65	11	3	6
3	17	23	....	59	78	62	8	3	6
4	20	23	50	63	78	67	8	3	7
5	20	23	45	66	73	66	8	3	7
6	20	23	42	66	67	61	8	2	7
7	20	23	37	65	65	56	10	2	7
8	23	23	40	68	62	54	11	2	7
9	23	27	41	69	60	50	10	2	6
10	23	27	41	67	60	45	9	2	7
11	23	27	43	66	59	40	8	1	8
12	23	30	45	65	57	35	8	1	8
13	23	30	47	63	56	31	7	2	9
14	23	30	49	63	57	29	9	3	9
15	23	30	49	63	54	29	7	4	10
16	23	30	50	65	51	28	7	5	11
17	23	35	50	63	49	27	7	5	10
18	23	40	50	59	50	26	6	5	11
19	23	40	48	58	59	27	6	4	10
20	23	40	46	60	61	27	6	4	9
21	23	40	46	60	62	26	5	4	9
22	23	39	47	62	65	24	5	4	8
23	23	38	48	76	69	24	4	4	8
24	23	37	49	80	77	22	4	5	9
25	23	36	50	76	77	19	4	6	9
26	23	36	51	74	76	17	4	6	13
27	23	35	52	73	73	16	3	6	16
28	23	35	54	69	69	15	3	6	13
29	23	35	57	63	71	14	3	6	13
30	23	36	60	59	72	13	3	6	13
31	23	....	61	....	69	....	3	6	....

Note.—Discharge interpolated Oct. 24, Nov. 3-6, 21-26, 28-30, Mar. 22-24, July 24-28, and 30. No record obtained Dec. 1 to Mar. 3.

Monthly discharge of Goose Creek above Trapper Creek, near Oakley, Idaho, for the year ending Sept. 30, 1915.

Month.	Discharge in second-feet.			Run-off (total in acre-feet).	Accuracy.
	Maximum.	Minimum.	Mean.		
October	23	17	22.0	1,350	C.
November	40	23	31.2	1,860	C.
Mar. 4-31	61	37	48.1	2,670	C.
April	80	58	65.3	3,890	C.
May	78	49	65.1	4,000	C.
June	67	13	36.1	2,150	C.
July	12	3	6.68	411	D.
August	6	1	3.81	234	D.
September	16	6	9.07	540	D.

TRAPPER CREEK NEAR OAKLEY, IDAHO.

Location.—In sec. 33, T. 14 S., R. 21 E., Cassia County, 1½ miles above Shaw's ranch, 1 mile west of east boundary of Minidoka National Forest, 5 miles above dam of the Twin Falls-Oakley project, and 9 miles southwest of Oakley.

Drainage area.—Not measured.

Records available.—May 1, 1911, to September 30, 1915.

Gage.—Friez water-stage recorder on left bank since April 8, 1913. From May 1, 1911, to August 27, 1912, a Lietz water-stage recorder was used, half a mile downstream from site of present gage and at different datum; from August 28, 1912, to April 7, 1913, fragmentary records were obtained from a staff gage opposite Shaw's house, 1½ miles below site of present gage.

Discharge measurements.—Made by wading.

Channel and control.—Stream bed composed of small boulders and coarse gravel; fairly permanent except at extremely high stages. Banks brushy and not likely to be overflowed.

Extremes of discharge.—Maximum stage during year, from water-stage recorder, 2.59 feet at 7 a. m. June 1 (discharge, 35 second-feet); minimum stage recorded, 1.96 feet September 3-8, inclusive (discharge, 9.1 second-feet).

1911-1915: Maximum stage recorded, 3.17 feet at 10 p. m. February 28, 1914 (discharge, 70 second-feet); minimum flow undoubtedly occurred in the winter, when stage-discharge relation is affected by ice.

Winter flow.—Stage-discharge relation greatly affected by ice; observations discontinued during the winter.

Diversions.—None of consequence above station.

Regulation.—None.

Accuracy.—Stage-discharge relation practically permanent. Rating curve well defined. Gage-height record not fully reliable at times. Mean daily gage heights obtained by inspecting recorder graph. Daily discharge ascertained by applying mean gage heights to rating table. Records good.

Cooperation.—Gage-height record furnished by Twin Falls-Oakley Land & Water Co.

Discharge measurements of Trapper Creek near Oakley, Idaho, during the year ending Sept. 30, 1915.

Date.	Made by—	Gage height.	Discharge.	Date.	Made by—	Gage height.	Discharge.
		Feet.	*Sec.-ft.*			*Feet.*	*Sec.-ft.*
Nov. 12	L. W. Roush	2.04	11.4	Aug. 1	A. W. Harrington	1.99	9.6
May 7	G. C. Baldwin	2.16	16.0				

Daily discharge, in second-feet, of Trapper Creek near Oakley, Idaho, for the year ending Sept. 30, 1915.

Day.	Oct.	Nov.	Dec.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.
1	11	11	11	....	14	17	21	11	10	11
2	11	11	12	....	14	17	19	11	10	10
3	11	11	12	11	15	17	18	11	10	9
4	11	11	12	11	15	17	18	11	10	9
5	12	11	12	11	15	16	18	11	10	9
6	12	11	12	11	15	16	17	11	10	9
7	12	11	12	11	14	16	16	11	10	9
8	12	11	12	11	14	15	16	11	10	9
9	12	11	....	12	14	15	16	11	10	9
10	12	11	....	11	14	15	15	11	10	9
11	12	11	....	11	14	15	15	11	9	9
12	11	11	....	11	14	16	15	11	9	9
13	11	11	....	12	14	16	15	11	9	10
14	11	11	....	12	14	16	14	11	9	10
15	11	12	....	12	14	15	14	10	9	10
16	11	....	....	12	15	15	14	10	9	11
17	11	....	....	12	15	16	14	10	9	11
18	11	....	....	12	14	18	13	10	9	11
19	12	....	....	12	14	18	13	10	9	10
20	11	....	....	12	14	17	13	10	9	10
21	11	....	....	12	15	17	12	10	9	10
22	11	....	....	12	17	17	12	10	9	10
23	12	....	....	12	17	18	12	10	10	10
24	12	....	....	13	17	19	12	10	11	10
25	12	....	....	13	16	19	11	10	10	10
26	12	....	....	13	16	18	12	10	10	10
27	12	....	....	13	16	18	12	10	10	10
28	12	....	....	13	16	18	11	10	10	11
29	11	....	....	14	16	18	11	10	10	11
30	11	....	....	14	16	17	11	10	9	11
31	11	....	....	14	....	17	....	10	10	....

NOTE.—Discharge interpolated, for lack of gage heights, Oct. 13 and 22-24. Discharge Nov. 16-30 estimated at 12 second-feet. No gage height record Nov. 16-30 or Dec. 9 to Mar. 2.

Monthly discharge of Trapper Creek near Oakley, Idaho, for the year ending Sept. 30, 1915.

Month.	Discharge in second-feet.			Run-off (total in acre-feet).	Accuracy.
	Maximum.	Minimum.	Mean.		
October	12	11	11.5	707	B.
November	....	....	11.5	684	D.
December 1-8	12	11	11.9	189	C.
March 3-31	14	11	12.1	696	B.
April	17	14	14.9	887	B.
May	19	15	16.7	1,030	B.
June	21	11	14.3	851	B.
July	11	10	10.5	646	B.
August	11	9	9.61	591	B.
September	11	9	9.90	589	B.

BIRCH CREEK NEAR OAKLEY, IDAHO.

LOCATION.—In sec. 24, T. 14 S., R. 23 E., Cassia County, 600 feet below head gates of Birch Creek feeder canal, three-fourths mile below Martindale's house, and 5 miles southeast of Oakley.

DRAINAGE AREA.—Not measured.

RECORDS AVAILABLE.—May 21, 1914, to September 30, 1915, for present location; January 1, 1912, to May 31, 1913, for station above feeder canal.

GAGE.—Friez water-stage recorder on left bank about 50 feet from the road; at station above the canal a vertical staff gage was used, supplemented at times by a Lietz water-stage recorder.

DISCHARGE MEASUREMENTS.—Made by wading.

CHANNEL AND CONTROL.—Bed composed of boulders which contract the channel just below the gage and make a good control; permanent under ordinary conditions of flow. Banks high; overflow unlikely. Point of zero flow, according to measurements made May 6, 1915, gage height 0.08 foot.

EXTREMES OF DISCHARGE.—Maximum stage during year, from water-stage recorder, 1.24 feet at 7 p. m. April 16 (discharge, 20 second-feet); gage heights for period of minimum flow not available.

1912–1915: Maximum stage recorded, 4.5 feet April 8, 1912 (discharge, 55 second-feet); minimum stage recorded, 0.12 foot at 9 p. m. August 26, 1914 (discharge practically zero).

WINTER FLOW.—Observations discontinued during winter.

DIVERSIONS.—The Birch Creek feeder canal diverts water from the stream about 600 feet above the gage and discharges into the Goose Creek reservoir of the Twin Falls-Oakley Land & Water Co. Practically no water was diverted through this canal during 1915.

REGULATION.—The flow can be entirely or partly regulated at the head gates of the feeder canal.

ACCURACY.—Stage-discharge relation practically permanent. Rating curve poorly defined October 1 to December 6, fairly well defined March to July. Mean daily gage heights obtained by inspecting recorder graph. Daily discharge ascertained by applying mean gage heights to rating tables. Records fair.

COOPERATION.—Gage-height record furnished by the Twin Falls-Oakley Land & Water Co.

Discharge measurements of Birch Creek near Oakley, Idaho, during the year ending Sept. 30, 1915.

Date.	Made by—	Gage height.	Discharge.	Date.	Made by—	Gage height.	Discharge.
		Feet.	*Sec.-ft.*			*Feet.*	*Sec.-ft.*
Nov. 13	L. W. Roush........	0.69	3.1	Aug. 1	A. W. Harrington....	0.52	1.9
May 6	G. C. Baldwin......	.88	8.5				

Daily discharge, in second-feet, of Birch Creek near Oakley, Idaho, for the year ending Sept. 30, 1915.

Day.	Oct.	Nov.	Dec.	Mar.	Apr.	May.	July.
1	2.2	2.7	2.7	......	8.2	7.4	......
2	2.3	3.2	2.7	......	8.7	8.2	......
3	3.0	3.2	2.9	......	9.6	11	......
4	2.9	3.2	3.0	......	8.4	10	......
5	3.1	3.2	3.0	......	8.2	9.3	......
6	3.3	3.2	3.0	......	8.0	8.4	......
7	3.2	3.2	......	......	7.7	8.0	......
8	3.2	3.2	......	......	7.4	7.4	3.2
9	3.2	3.3	......	2.7	7.2	7.2	3.4
10	3.1	3.3	......	2.8	6.7	7.4	3.1
11	3.1	3.3	......	2.8	6.7	7.2	2.8
12	3.0	3.2	......	3.1	6.7	7.4	2.6
13	3.0	3.1	......	3.4	6.2	7.2	2.6
14	2.9	2.9	......	3.4	7.0	7.2	2.5
15	2.7	2.8	......	5.2	6.4	......	......
16	1.9	3.0	......	5.8	7.7	......	......
17	1.8	3.1	......	2.9	7.2	......	......
18	2.4	2.8	......	1.9	6.4	......	......
19	2.9	2.7	......	1.9	6.2	......	......
20	2.9	2.6	......	2.3	6.7	......	......
21	2.9	2.5	......	4.1	8.4	......	......
22	2.9	2.5	......	7.0	10	......	......
23	3.0	2.5	......	8.2	9.3	......	......
24	3.0	2.5	......	9.0	7.7	......	......
25	3.0	2.6	......	8.2	7.4	......	......
26	3.1	2.6	......	7.4	7.4	......	......
27	3.1	2.6	......	7.2	6.7	......	......
28	3.1	2.6	......	7.7	6.2	......	......
29	3.2	2.6	......	8.7	6.0	......	......
30	3.2	2.7	......	8.7	7.0	......	......
31	3.2	......	......	8.2	......	......	......

NOTE.—No gage height record obtained Oct. 23-28, Nov. 19, 20, 22-28, Dec. 7 to Mar. 8, May 15 to July 7 or July 15 to Sept. 30. Discharge interpolated Oct. 23-28, Nov. 19 20, and 22-28.

Monthly discharge of Birch Creek near Oakley, Idaho, for the year ending Sept. 30, 1915.

Month.	Discharge in second-feet.			Run-off (total in acre-feet).	Accuracy.
	Maximum.	Minimum.	Mean.		
October	3.3	1.8	2.90	178	C.
November	3.3	2.5	2.90	173	C.
December 1-6	3.0	2.7	2.88	34.3	C.
March 9-31	9.0	1.9	5.33	244	C.
April	10	6.0	7.45	443	B.
May 1-14	11	7.2	8.09	225	B.
July 8-14	3.4	2.5	2.89	40.1	C.

NORTH SIDE TWIN FALLS CANAL AT MILNER, IDAHO.

LOCATION.—In sec. 20, T. 10 S., R. 21 E., Minidoka County, at highway bridge half a mile north of Milner post office and about three-fourths mile below head gates at Milner dam.

RECORDS AVAILABLE.—May 10, 1909, to September 30, 1915.

GAGE.—Vertical staff attached to downstream side of bridge pier near left bank; read by F. W. Deming, October 1, 1914, to June 26, 1915, and by T. R. Newell, June 27, to September 30, 1915. Datum of gage has remained unchanged since the establishment of the station and the original gage is still in use. A slide gage was installed on the bridge in 1911 and was set to read the same as the vertical staff, but its use was discontinued in 1913. A Lietz water-stage recorder was installed in 1912, in a shelter over the staff gage, but it never operated entirely satisfactorily and its use was abandoned in 1913. At the present time the vertical staff is used exclusively.

DISCHARGE MEASUREMENTS.—Made from a cable about 150 feet below the gage.

CHANNEL AND CONTROL.—Channel is a permanent concrete-lined section. Moss growth is heavy during the summer months and stage-discharge relation is greatly affected. Control section apparently indeterminate.

WINTER FLOW.—Stage-discharge relation not affected by ice; open-channel rating curves used throughout year.

EXTREMES OF DISCHARGE.—Maximum stage recorded during year, 7.6 feet at 8 a. m. June 14 (discharge, 2,600 second-feet); canal reported dry October 7 to November 25.

1909–1915: Maximum discharge recorded, 2,800 second-feet, July 13, 14, 19, and 20, 1913, corresponding to a gage height of 7.9 feet. Canal reported dry at various times in 1909, 1910, and 1914.

DIVERSIONS.—None between gage and head gates and none for some distance below gage. Surplus water may be discharged into the river through waste gates about 200 feet below head of canal.

REGULATION.—Flow regulated by the head gates and waste gates.

ACCURACY.—Stage-discharge relation not permanent. Gage read once daily October 1 to June 26 and twice daily June 27 to September 30. Daily discharge ascertained by shifting-control method. Records excellent for periods in which discharge measurements were made daily; good for rest of year.

COOPERATION.—Most of the discharge measurements have been made by the hydrographer stationed at this point by the State during the irrigation season in connection with the delivery of stored water from Jackson Lake.

The North Side Twin Falls canal diverts water from the north side of Snake River at the Milner dam. This canal furnishes water for stock and for irrigation of about 240,000 acres of land in Minidoka, Lincoln, and Gooding counties. The distribution system comprises about 100 miles of main canal and about 625 miles of laterals.

Discharge measurements of North Side Twin Falls canal at Milner, Idaho, during the year ending Sept. 30, 1915.

Date.	Made by—	Gage height.	Discharge.
		Feet.	*Sec.-ft.*
May 8	G. C. Baldwin	7.10	2,220
June 12	A. W. Harrington	7.35	2,460
15	Harrington and Newell [a]	7.05	2,360
17	T. R. Newell [a]	7.30	2,480
18	do	7.32	2,490
19	do	6.50	2,170
19	do	6.30	2,040
20	do	6.46	2,110
21	do	6.98	2,330
22	do	6.80	2,240
23	do	6.84	2,260
24	do	6.80	2,250
25	do	6.70	2,150
27	do	6.78	2,150
27	do	6.82	2,210
28	do	6.83	2,210
29	do	6.82	2,170
30	do	6.89	2,180
July 1	do	6.86	2,170
2	do	6.89	2,190
3	do	7.00	2,250
3	do	7.00	2,200
4	do	7.05	2,240
5	do	7.05	2,210
7	do	6.60	2,000
8	do	6.43	1,920
9	do	6.40	1,900
10	do	6.45	1,920
11	do	6.38	1,870
12	do	6.42	1,890
13	do	6.34	1,830
14	do	6.43	1,890
15	do	6.20	1,730
15	do	2.62	428
16	do	2.31	340
16	do	5.90	1,540
17	do	5.90	1,520
18	do	5.90	1,530
18	do	3.82	770
19	do	3.75	715
20	do	3.86	759
21	do	3.85	739
22	do	3.98	732
23	do	5.01	1,140
24	do	5.28	1,270
25	do	4.54	1,000
26	do	3.50	645
27	do	3.51	651
28	do	3.58	650
28	do	3.56	631
29	do	3.58	634
29	Harrington and Newell	3.61	572
30	T. R. Newell	3.62	582
30	A. W. Harrington	3.65	567
31	T. R. Newell	3.66	592
Aug. 1	do	3.58	572
2	do	3.62	537
3	do	3.62	539
Aug. 4	T. R. Newell	3.70	541
5	do	3.79	554
6	do	3.86	574
7	do	3.83	553
8	do	6.66	1,730
8	do	6.74	1,760
9	do	6.80	1,850
10	do	6.83	1,900
11	do	6.65	1,880
12	do	6.75	1,970
13	do	6.58	1,860
14	do	5.94	1,610
15	do	2.09	275
16	do	2.03	274
17	do	2.00	267
18	do	2.00	258
18	Baldwin and Hoyt	1.98	245
19	T. R. Newell	1.99	248
20	do	2.03	255
21	do	2.05	256
22	do	2.05	255
23	do	2.08	258
24	do	2.05	255
25	do	2.03	255
26	do	2.01	255
27	do	1.98	248
28	do	1.98	254
28	do	4.30	962
29	do	4.22	973
30	do	1.92	253
31	do	1.92	259
Sept. 1	do	3.30	648
2	do	4.44	1,080
3	do	4.43	1,080
4	do	4.38	1,070
5	do	4.35	1,060
6	do	4.30	1,050
7	do	4.25	1,020
8	do	4.26	1,030
9	do	4.22	1,020
10	do	4.15	991
11	do	4.00	935
12	do	3.80	862
13	do	3.66	780
14	do	3.72	795
15	do	5.02	1,340
16	do	6.06	1,790
17	do	6.36	1,900
18	do	6.34	1,900
19	do	6.26	1,909
20	do	6.30	1,880
21	do	5.50	1,530
22	do	5.36	1,470
23	do	5.90	1,706
24	do	5.77	1,650
25	do	5.77	1,650
26	do	5.86	1,690
27	do	2.14	307
29	do	1.87	269

[a] Special assistant to State engineer.

Daily discharge, in second-feet, of North Side Twin Falls canal at Milner, Idaho, for the year ending Sept. 30, 1915.

Day.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.
1	1,490	....	171	181	853	828	1,180	2,310	2,300	2,150	568	500
2	1,750	....	114	181	840	684	1,180	2,330	2,190	2,200	547	961
3	1,410	....	97	171	828	684	1,220	2,350	2,070	2,240	529	1,0[illegible]
4	1,370	....	151	151	828	828	1,220	2,400	2,210	2,240	538	1,0[illegible]
5	1,410	....	203	181	828	141	1,640	2,400	2,350	2,220	568	1,040
6	1,370	....	1,060	171	904	82	1,640	2,260	2,490	2,120	568	1,040
7	....	....	1,140	171	904	1,220	1,640	2,240	2,450	1,970	1,080	1,040
8	....	....	1,220	161	866	1,560	1,730	2,220	2,500	1,910	1,710	1,040
9	....	....	1,100	584	904	1,520	1,820	2,400	2,410	1,890	1,820	1,000
10	....	....	1,140	616	904	1,560	1,820	2,360	2,280	1,880	1,880	1,000
11	....	....	1,060	584	866	1,520	1,910	2,230	2,280	1,860	1,910	923
12	....	....	1,020	553	866	1,640	1,840	2,280	2,460	1,860	2,020	865
13	....	....	1,020	584	828	1,690	1,770	2,280	2,490	1,860	1,880	737
14	....	....	980	616	828	1,640	1,690	2,330	2,600	1,860	1,620	847
15	....	....	1,020	616	904	1,730	1,640	2,380	2,400	1,020	272	1,080
16	....	....	1,020	553	980	1,730	904	2,330	2,350	866	248	1,590
17	....	....	1,000	553	828	1,770	1,060	2,290	2,490	1,520	248	1,880
18	....	....	1,000	616	866	1,690	1,470	2,290	2,490	1,140	248	1,930
19	....	....	980	584	866	1,300	2,080	2,380	2,080	720	248	1,880
20	....	....	412	616	942	1,220	2,080	2,300	2,130	755	248	1,880
21	....	....	438	616	828	1,220	2,040	2,390	2,310	755	272	1,540
22	....	....	438	650	684	1,140	2,080	2,390	2,260	980	248	1,490
23	....	....	438	755	584	1,140	2,220	2,440	2,260	1,220	248	1,620
24	....	....	438	866	980	1,390	2,260	2,490	2,260	1,260	248	1,660
25	....	....	438	828	980	1,370	2,130	2,450	2,100	792	248	1,660
26	....	1,300	438	866	1,060	1,340	2,180	2,410	2,200	616	248	1,710
27	....	897	438	828	1,140	1,320	2,240	2,500	2,200	616	248	885
28	....	494	236	828	1,220	1,290	2,300	2,370	2,200	650	547	296
29	....	494	236	828	....	1,270	2,350	2,380	2,150	607	950	260
30	....	494	192	866	....	1,250	2,330	2,420	2,150	568	248	248
31	....	....	181	866	....	1,220	....	2,420	....	600	255	....

NOTE.—Canal reported dry Oct. 7 to Nov. 25. No gage-height record received; discharge interpolated Nov. 27, Feb. 1, 2, 26, 27, Mar. 25–30, Apr. 8, 12, 13, 26–28, 30, May 2, 7, 14, 16, 25, June 1, 2, and 5.

Monthly discharge of North Side Twin Falls canal at Milner, Idaho, for the year ending Sept. 30, 1915.

Month.	Discharge in second-feet.			Run-off (total in acre-feet).	Accuracy.
	Maximum.	Minimum.	Mean.		
October	1,750	0	284	17,500	C.
November	1,300	0	123	7,320	C.
December	1,220	97	639	39,300	B.
January	866	151	556	34,200	B.
February	1,220	584	890	49,400	B.
March	1,770	82	1,260	77,500	B.
April	2,350	904	1,790	107,000	B.
May	2,500	2,220	2,360	145,000	A.
June	2,600	2,070	2,300	137,000	A.
July	2,240	568	1,390	85,500	A.
August	2,020	248	726	44,600	A.
September	1,930	248	1,160	69,000	A.
The year	2,600	0	1,120	813,000	

SOUTH SIDE TWIN FALLS CANAL AT MILNER, IDAHO.

Location.—In sec. 29, T. 10 S., R. 21 E., at the wagon bridge about one-eighth of a mile below the head gates at the village of Milner, Twin Falls County.

Records available.—May 10, 1909, to September 30, 1915.

Gage.—Vertical staff in two sections, read by F. W. Deming October 1, 1914, to June 26, 1915, and by T. R. Newell from June 27 to September 30, 1915. The main or upper section of the gage is on the left bank of the canal about 100 feet upstream from the highway bridge, to the lower side of which the low-water section is fastened. This low-water section is the original gage, but on account of the difficulty in making readings accurately at high stages the high-water section was installed early in the summer of 1912 and has since been used exclusively for stages above 5.3 feet. The two sections read practically the same, although the datum of the upstream section is about 0.1 foot higher than the other. A Friez water-stage recorder is installed opposite the upper staff gage, but was not in use during the year ending September 30, 1915.

Discharge measurements.—Made from the bridge.

Channel and control.—Channel at gage is blasted out of rock and is practically permanent, but slight changes of control occasionally occur due to washing in and deposit of silt.

Winter flow.—Stage-discharge relation seldom affected by ice; open-channel rating curves used throughout year. Because of the close proximity of the gaging station to the head gates, ice never forms in the immediate vicinity of the gage, but it has been known to form to a sufficient extent farther down the canal to affect the stage-discharge relation.

Extremes of discharge.—Maximum stage recorded during year, 9.8 feet May 1–9, June 12–14 and 17 (discharge, 3,250 second-feet); minimum stage recorded, 1.8 feet March 10 and April 3 (discharge, 94 second-feet).

1909–1915: Maximum stage recorded in May and June, 1915; minimum stage recorded, 0.8 foot April 7, 1913 (discharge, 11 second-feet).

Diversions.—None from canal above gage and none of consequence for several miles below.

Regulation.—Flow regulated at head gates.

Accuracy.—Stage-discharge relation practically permanent, but may have been changed slightly by effect of ice during winter months. Rating curve well defined. Gage read once daily October 1 to June 26 and twice daily June 27 to September 30. Discharge determined by applying mean daily gage height to rating table. Open-water records good; winter records somewhat uncertain, owing to unknown effect of ice.

Cooperation.—Gage-height record furnished and part of the discharge measurements made by employees of the Twin Falls Canal Co. and of the Idaho State Engineer.

The South Side Twin Falls canal diverts water from the south side of Snake River at the Milner dam. This canal furnishes water for stock and for the irrigation of about 200,000 acres of land in the vicinity of Twin Falls. The distribution system comprises about 110 miles of main canal and about 590 miles of laterals.

Discharge measurements of South Side Twin Falls canal at Milner, Idaho, during the year ending Sept. 30, 1915.

Date.	Made by—	Gage height.	Discharge.
		Feet.	*Sec.-ft.*
Nov. 9	L. W. Roush	4.91	870
June 13	A. W. Harrington	9.81	3,150
21	Lyman	9.39	2,950
June 29	T. R. Newell	9.35	2,980
July 29	A. W. Harrington	7.33	1,850
Aug. 15	T. R. Newell	7.57	1,950

Daily discharge, in second-feet, of South Side Twin Falls canal at Milner, Idaho, for the year ending Sept. 30, 1915.

Day.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.
1	1,320	809	776	1,090	712	532	398	3,250	2,190	2.950	1,830	1,700
2	1,200	842	712	1,090	712	532	398	3,250	2,190	3,010	1,830	1,480
3	1,090	809	712	1,090	776	590	94	3,250	2,470	3,010	1,830	1,400
4	1,010	809	712	1,010	776	590	504	3,250	2,470	3,010	1,980	1,400
5	1,050	809	712	1,050	842	590	561	3,250	2,470	3,010	1,980	1,400
6	1,010	809	776	1,010	842	590	561	3,250	2,250	2,950	1,980	1,400
7	909	809	744	1,010	875	590	744	3,250	2,250	1,880	1,980	1,400
8	909	809	744	1,010	875	590	681	3,250	3,070	1,880	1,980	1,400
9	809	809	744	1,010	875	590	776	3,250	3,070	1,880	1,980	1,400
10	809	809	909	978	809	94	1,120	1.700	3,070	1,880	1,980	1,880
11	809	809	978	978	809	776	1,440	2,300	3.190	1,980	1,980	1,880
12	809	809	776	842	809	102	1,700	2,030	3,250	2,250	1,980	2,030
13	809	809	909	842	809	650	1,790	2,030	3,250	2,300	1,980	2,190
14	809	809	978	842	809	650	1,830	2,030	3,250	2,300	1,980	2,250
15	809	909	1,120	842	809	650	1,880	2,030	3,190	2,650	1,980	2,250
16	776	809	1,160	842	809	650	1,880	2,030	3,130	2,650	1,980	2,190
17	809	809	1,160	842	809	875	1,440	2,360	3,250	2,650	1,980	2,140
18	809	809	1,200	842	325	373	160	2,190	3,010	2,590	1,930	2,140
19	809	809	1,200	842	325	650	1,280	2,030	2,890	2,590	1,880	2,140
20	776	809	1,200	842	325	650	1,280	1,980	2,890	2,590	1,880	2,140
21	776	744	1,200	909	424	744	1,700	1,930	3,010	2,590	1,880	2,140
22	776	744	1,200	978	424	477	2,030	1,980	3,010	2.140	1,880	2,190
23	776	142	1,280	909	424	102	2,190	1,980	3,010	1,980	1,880	2,300
24	776	744	1,280	909	424	532	2,530	1,830	3,010	1,980	1,880	2,300
25	776	744	1,280	909	424	532	2,530	1,830	3,010	1,930	1,880	2.300
26	842	744	1,240	909	424	398	3,010	1,880	3,010	1,830	1,830	2,300
27	809	744	978	842	424	398	3,070	1,930	3,010	1,830	1,830	2,190
28	809	744	978	776	450	398	3,130	1,980	3,010	1,830	1,830	2,080
29	809	744	1,120	776	......	590	3,190	2,030	3,010	1,830	1,830	1,980
30	809	744	1,120	744	......	744	3,190	2,090	3,010	1,830	1,830	1,930
31	809	......	1,090	776	......	744	......	2,190	......	1,830	1,830	......

NOTE.—No gage-height record received May 26-29; discharge interpolated.

Monthly discharge of South Side Twin Falls canal at Milner, Idaho, for the year ending Sept. 30, 1915.

Month.	Discharge in second-feet.			Run-off (total in acre-feet).	Accuracy.
	Maximum.	Minimum.	Mean.		
October	1,320	776	868	53,400	A.
November	909	142	772	45,900	B.
December	1,280	712	1,000	61,500	D.
January	1,090	744	914	56,200	D.
February	875	325	648	36,000	C.
March	875	94	548	33,700	B.
April	3,190	94	1,570	93,400	A.
May	3,250	1,700	2,370	146,000	B.
June	3,250	2,190	2,900	173,000	A.
July	3,010	1,830	2,310	142,000	A.
August	1,980	1,830	1,910	117,000	A.
September	2,300	1.400	1,930	115,000	A.
The year	3,250	94	1,480	1,070,000	

BIG COTTONWOOD CREEK NEAR OAKLEY, IDAHO.

LOCATION.—In sec. 19, T. 13 S., R. 21 E., one-fourth mile above heading of Twin Falls-Oakley Land & Water Co. feeder canal, 1 mile above J. H. Roark's house, 2 miles above mouth of Cedar Creek, and 10 miles northwest of Oakley, Cassia County.

DRAINAGE AREA.—Not measured.

RECORDS AVAILABLE.—November 27, 1909, to January 10, 1915, when station was discontinued.

Gage.—Friez water-stage recorder on left bank half a mile above site of vertical staff gage which was used November 27, 1909, to April 27, 1913. Present gage read 0.72 foot July 28, 1913, when old gage read 1.20 feet.

Discharge measurements.—Made by wading or from footbridge at old station.

Channel and control.—Bed composed chiefly of small cobblestones and boulders; may shift at high stages. Banks fairly high; overflow unlikely. Point of zero flow estimated August 25, 1915, gage height 0.3 foot.

Extremes of discharge.—Gage heights for the year ending September 30, 1915, too incomplete to warrant publication of maximum and minimum.

1909–1914: Maximum stage recorded, 3.7 feet (old gage datum) May 30, 1912 (discharge, 125 second-feet); minimum discharge practically zero and was observed in both 1910 and 1915.

Winter flow.—Stage-discharge relation not seriously affected by ice; open-channel rating curve assumed applicable.

Diversions.—During the late summer most of the flow of the stream is diverted around the station in order to minimize loss by seepage. The capacity of the diversion ditch is not definitely known.

Regulation.—None except that due to diversion.

Accuracy.—Stage-discharge relation practically permanent throughout the year. Rating curve fairly well defined. Gage-height record fragmentary. Mean daily gage heights determined by inspecting recorder graph. Daily discharge ascertained by applying mean gage heights to rating table. Records fair above and poor below 2 second-feet.

Cooperation.—Gage-height record furnished by the Twin Falls-Oakley Land & Water Co.

Discharge measurements of Big Cottonwood Creek near Oakley, Idaho, during the year ending Sept. 30, 1915.

Date.	Made by—	Gage height.	Discharge.	Date.	Made by—	Gage height.	Discharge.
		Feet.	*Sec-ft.*			*Feet.*	*Sec.-ft.*
Nov. 14	L. W. Roush	0.58	1.8	July 30	A. W. Harrington	0.51	1.2
May 5	G. C. Baldwin	.91	14.4				

Daily discharge, in second-feet, of Big Cottonwood Creek near Oakley, Idaho, for the year ending Sept. 30, 1915.

Day.	Oct.	Nov.	Dec.	Jan.	Day.	Oct.	Nov	Dec.	Jan
1	1.4	2.2	1.4	0.8	16	1.9	1.4	1.2	
2	1.6	2.2	1.5	.8	17	2.1	1.5	1.1	
3	1.9	2.2	1.6	.8	18	2.2	1.5	1.0	
4	2.2	2.2	1.6	.8	19	2.1	1.6	.9	
5	2.2	2.2	1.5	.8	20	2.1	1.6	.8	
6	2.5	2.2	1.5	.8	21	2.2	1.5	.8	
7	2.2	2.2	1.1	.8	22	2.5	1.5	.8	
8	2.1	2.1	1.2	.8	23	2.5	1.4	.8	
9	2.2	2.1	1.2	.8	24	2.5	1.4	.8	
10	2.2	2.1	1.3	.8	25	2.2	1.4	.8	
11	2.2	2.1	1.4		26	2.2	1.4	.8	
12	2.2	2.2	1.4		27	2.2	1.4	.8	
13	2.1	2.1	1.5		28	2.2	1.4	.8	
14	1.9	1.9	1.4		29	2.2	1.5	.8	
15	1.9	1.5	1.3		30	2.2	1.5	.8	
					31	2.2		.8	

Note.—Discharge interpolated on account of lack of gage heights Dec. 10–12, 14–19, 21–26, Dec. 28 to Jan. 2, and Jan. 4–9.

Monthly discharge of Big Cottonwood Creek near Oakley, Idaho, for the year ending Sept. 30, 1915.

Month.	Discharge in second-feet.			Run-off (total in acre-feet).	Accuracy.
	Maximum.	Minimum.	Mean.		
October	2.5	1.4	2.14	132	C.
November	2.2	1.4	1.78	106	C.
December	1.6	.8	1.12	68.9	D.
January	.8	.8	.80	15.9	D.
The period				323	

SALMON FALLS CREEK ABOVE UPPER VINEYARD DITCH, NEAR CONTACT, NEV.

LOCATION.—In sec. 5, T. 44 N., R. 63 E., three-fourths mile above head gates of Upper Vineyard ditch, 3 miles above ranch house on Vineyard ranch, and 10½ miles southwest of Contact, Elko County.

DRAINAGE AREA.—Not measured.

RECORDS AVAILABLE.—May 17, 1914, to July 25, 1915, when station was discontinued.

GAGE.—Stevens water-stage recorder on right bank.

DISCHARGE MEASUREMENTS.—Made by wading or from cable just above gage.

CHANNEL AND CONTROL.—Bed composed of rocks, gravel, and sand. Control permanent during period covered by record.

WINTER FLOW.—Stage-discharge relation probably affected by ice for short periods winter gage-height record fragmentary.

EXTREMES OF DISCHARGE.—Maximum stage during year, from water-stage recorder, 6.69 feet from 2 to 8 p. m. May 17 (discharge, 207 second-feet); minimum stage, 5.17 feet July 17, 18, 23, and 24 (discharge, 24 second-feet). Both maximum and minimum stages probably occurred during period of no records.

1914–1915: Maximum discharge recorded, 596 second-feet May 17–19, 1914 (estimated from hydrograph); minimum stage recorded in July, 1915.

DIVERSIONS.—Station is above all diversions on Vineyard and San Jacinto ranches.

REGULATION.—None.

ACCURACY.—Stage-discharge relation practically permanent. Rating curve well defined. Operation of water-stage recorder satisfactory but instrument not inspected regularly. Mean daily gage heights obtained by inspecting recorder graph. Daily discharge ascertained by applying mean gage heights to rating table. Records good.

COOPERATION.—Gage-height record and some discharge measurements furnished by Utah Construction Co.

Discharge measurements of Salmon Falls Creek above Upper Vineyard ditch, near Contact, Nev., during the year ending Sept. 30, 1915.

Date.	Made by—	Gage height.	Discharge.	Date.	Made by—	Gage height	Discharge.
		Feet.	*Sec.-ft.*			*Feet.*	*Sec.-ft.*
Oct. 5	L. W. Beason[a]	5.39	39.4	May 2	G. C. Baldwin	6.55	176
17	do	5.38	39.1	July 25	A. W. Harrington	5.18	28.5

[a] Employee of Utah Construction Co.

Daily discharge, in second-feet, of Salmon Falls Creek above Upper Vineyard ditch, near Contact, Nev., for the year ending Sept. 30, 1915.

Day.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.
1	38	40	33	45	....	36	84	202	....	38
2	38	39	32	44	....	36	87	188	....	36
3	39	39	33	45	....	36	96	177	....	33
4	38	39	33	45	....	35	100	161	....	34
5	38	39	34	45	....	35	101	145	....	36
6	38	39	34	45	....	33	101	130	....	36
7	38	38	32	45	....	33	105	121	....	38
8	39	38	30	46	....	33	108	116	....	37
9	44	36	32	46	....	34	99	112	....	37
10	42	36	....	47	....	35	100	112	....	34
11	41	36	....	47	....	36	106	109	....	32
12	40	36	....	48	....	38	116	130	....	31
13	39	36	....	49	....	38	120	150	....	30
14	38	36	....	43	....	39	126	153	....	28
15	38	32	....	....	....	41	123	140	....	27
16	38	31	....	....	....	42	121	176	....	26
17	38	32	....	....	....	44	121	200	....	24
18	38	30	....	....	....	47	127	196	....	24
19	38	29	....	....	....	47	139	....	....	26
20	37	29	....	....	....	46	147	....	....	26
21	40	28	43	....	36	47	163	....	....	27
22	45	28	44	....	35	52	191	....	....	25
23	45	32	43	....	35	64	181	....	....	24
24	44	31	44	....	35	78	163	....	....	24
25	43	32	44	....	36	82	156	....	....	25
26	42	32	45	....	38	81	152	....	....	....
27	42	34	44	....	37	82	145	....	47	....
28	41	35	44	....	35	84	145	....	48	....
29	40	33	44	....	....	92	155	....	43	....
30	40	32	44	....	....	96	182	....	39	....
31	40	....	45	....	....	88	....	....	....	....

NOTE.—Discharge Dec. 10-20 estimated at 35 second-feet. No records obtained Jan. 15 to Feb. 20 and May 19 to June 26.

Monthly discharge of Salmon Falls Creek above Upper Vineyard ditch, near Contact, Nev., for the year ending Sept. 30, 1915.

Month.	Discharge in second-feet.			Run-off (total in acre-feet).	Accuracy.
	Maximum.	Minimum.	Mean.		
October	45	37	40.0	2,460	B.
November	40	28	34.2	2,040	B.
December	....	....	37.5	2,310	C.
January 1-14	49	43	45.7	1,270	C.
February 21-28	38	35	35.9	570	B.
March	96	33	51.9	3,190	B.
April	191	84	129	7,680	B.
May 1-18	202	109	151	5,390	B.
June 27-30	48	39	44.2	351	B.
July 1-25	38	24	30.3	1,500	B.

SALMON FALLS CREEK NEAR SAN JACINTO, NEV.

LOCATION.—In sec. 23, T. 47 N., R. 64 E., in canyon 200 yards below county highway bridge and 5 miles north of San Jacinto, Elko County. Shoshone Creek enters 250 yards above station.

DRAINAGE AREA.—Not measured.

RECORDS AVAILABLE.—September 17, 1909, to September 30, 1915.

GAGE.—Barrett and Lawrence water-stage recorder on the right bank; installed November 20, 1911. Gage used prior to June 30, 1910, was a vertical staff on right bank a short distance upstream from site of present gage and at different datum. From July 1, 1910, to November 19, 1911, record was obtained from a Friez recorder at present site and datum.

DISCHARGE MEASUREMENTS.—Made by wading or from a cable 20 feet below gage.

CHANNEL AND CONTROL.—Bed composed of gravel. Control shifts slightly. At high stages left bank is subject to overflow, and creek may flow in two channels.

EXTREMES OF DISCHARGE.—Maximum stage recorded during year, 3.79 feet May 25 and 26 (discharge, 246 second-feet); minimum stage recorded, 2.18 feet September 14 and 16 (discharge, 14 second-feet).

1909–1915: Maximum stage recorded, 7.5 feet May 22, 1912 (discharge, 1,280 second-feet); minimum stage recorded 2.18 feet September 14 and 16, 1915 (discharge, 14 second-feet).

WINTER FLOW.—Stage-discharge relation not seriously affected by ice; open channel rating curve assumed applicable.

DIVERSIONS.—A large number of diversions on the ranches of the Vineyard Land & Stock Co. above the station appropriate practically all the low-water flow of Salmon Falls Creek and Shoshone Creek.

REGULATION.—None above the gage. The dam of the Twin Falls-Salmon River Land & Water Co. is about 15 miles below the station and the Salmon reservoir has a capacity of about 180,000 acre-feet.

ACCURACY.—Stage-discharge relation not permanent. Rating curves fairly well defined October 1 to December 15 and December 30 to September 30. Mean daily gage heights obtained by inspecting recorder graph. Daily discharge ascertained by applying mean gage heights to rating tables; shifting-control method used December 16–29. Records good.

COOPERATION.—Gage-height record furnished and part of discharge measurements made by the Twin Falls-Salmon River Land & Water Co.

Discharge measurements of Salmon Falls Creek near San Jacinto, Nev., during the year ending Sept. 30, 1915.

Date.	Made by—	Gage height.	Discharge.	Date.	Made by—	Gage height.	Discharge.
		Feet.	*Sec-ft.*			*Feet.*	*Sec.-ft.*
Feb. 28	C. E. Tappan [a]	2.89	76.9	May 1	G. C. Baldwin	3.48	179
Mar. 30	....do	3.49	171	July 24	A. W. Harrington	2.26	18.1

[a] Employee of Twin Falls-Salmon River Land & Water Co.

Daily discharge, in second-feet, of Salmon Falls Creek near San Jacinto, Nev., for the year ending Sept. 30, 1915.

Day.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.
1	38	66	51	51	60	77	165	178	202	31	15	15
2	39	66	50	51	63	77	159	198	211	28	15	16
3	41	66	60	51	62	77	155	209	220	26	15	15
4	42	65	62	50	61	76	159	200	218	25	15	15
5	42	66	62	49	60	76	172	193	211	25	15	15
6	42	71	62	48	57	74	176	204	191	25	15	15
7	43	69	52	50	58	72	174	163	176	25	15	15
8	45	68	52	53	61	71	174	151	159	24	15	15
9	48	66	48	53	62	72	174	133	144	24	15	15
10	49	65	51	52	64	72	170	124	126	23	15	15
11	50	60	62	53	64	74	165	112	117	22	15	15
12	49	60	60	53	65	76	165	108	114	22	15	15
13	50	60	52	54	64	80	165	105	112	22	15	15
14	57	62	44	54	64	80	172	107	......	21	15	14
15	58	59	43	55	64	82	182	107	......	20	15	15
16	59	59	47	54	65	84	182	105	......	20	15	14
17	59	58	49	52	68	86	180	108	......	20	15	15
18	58	56	50	51	72	86	176	136	......	20	15	15
19	57	54	50	51	74	89	172	148	......	20	15	15
20	58	52	49	50	74	89	170	176	......	18	15	15
21	59	52	49	50	74	90	170	200	......	18	15	15
22	70	54	50	49	75	94	180	220	......	19	15	15
23	69	62	49	46	72	99	198	225	......	18	15	15
24	68	63	49	45	71	104	200	243	......	18	15	15
25	65	63	51	44	72	119	200	246	......	17	16	15
26	66	63	51	43	75	131	195	246	......	16	16	16
27	64	62	50	43	74	146	184	239	......	16	15	16
28	65	60	50	43	75	151	176	230	......	16	15	15
29	65	60	50	47	......	159	170	230	......	16	15	15
30	66	52	50	52	......	174	172	220	32	16	15	16
31	65	......	50	55	......	176	......	207	......	16	15	......

NOTE.—Discharge June 14-29 estimated at 72 second-feet on account of lack of gage heights.

Monthly discharge of Salmon Falls Creek near San Jacinto, Nev., for the year ending Sept. 30, 1915.

Month.	Discharge in second-feet.			Run-off (total in acre-feet).	Accuracy.
	Maximum.	Minimum.	Mean.		
October	70	38	55.0	3,380	C.
November	71	52	61.3	3,650	C.
December	62	43	51.8	3,190	C.
January	55	43	50.1	3,080	C.
February	75	57	66.8	3,710	B.
March	176	71	97.2	5,980	B.
April	200	155	175	10,400	B.
May	246	105	176	10,800	A.
June	220	32	113	6,720	C.
July	31	16	20.9	1,290	B.
August	16	15	15.1	928	B.
September	16	14	15.1	898	B.
The year	246	14	74.7	54,000	

SHOSHONE CREEK NEAR SAN JACINTO, NEV.

Location.—In sec. 17, T. 47 N., R. 65 E., half a mile above headworks of North Side ditch, 2 miles above house on Shoshone Creek ranch, and 11 miles northeast of San Jacinto, Elko County.

Drainage area.—Not measured.

Records available.—May 14, 1914, to August 24, 1915, when station was discontinued.

Gage.—Stevens water-stage recorder on right bank; installed August 27, 1914; May 14 to August 27, staff gage about 500 feet downstream at different datum, used also as a reference gage for Lietz water-stage recorder June 15 to July 31, 1914, and Stevens recorder August 3 to 27, 1914.

Discharge measurements.—Made by wading or from a cable about 500 feet downstream.

Channel and control.—Bed consists of gravel and loose rocks. Control not permanent.

Extremes of discharge.—Maximum stage recorded during year, 5.94 feet 9 to 11 p. m. May 23 (discharge, 151 second-feet); minimum stage, 3.58 feet at 10 a. m. July 27 (discharge, 7.6 second-feet).

1914–15: Maximum stage recorded, 5.94 feet 9 to 11 p. m. May 23, 1915 (discharge, 151 second-feet); minimum stage, 0.26 foot (old staff gage datum) August 22–27, 1914 (discharge, 7.4 second-feet).

Winter flow.—Stage-discharge relation probably affected by ice. No winter records obtained.

Diversions.—Station above all diversions on Shoshone ranch. Numerous diversions made in Shoshone basin about 10 miles above station.

Accuracy.—Stage-discharge relation not permanent; changed during the winter. Rating curves well defined October 1 to December 6 and February 15 to August 24. Gage-height record incomplete owing to lack of attention to recorder. Mean daily gage heights obtained by inspecting recorder graph. Daily discharge ascertained by applying mean gage heights to rating tables. Records fair.

Cooperation.—Gage-height record furnished by Utah Construction Co.

Discharge measurements of Shoshone Creek near San Jacinto, Nev., during the year ending Sept. 30, 1915.

Date.	Made by—	Gage height.	Discharge.
		Feet.	*Sec.-ft.*
May 3	G. C. Baldwin	4.52	47.0
July 27	A. W. Harrington	3.58	7.6

Daily discharge, in second-feet, of Shoshone Creek near San Jacinto, Nev., for the year ending Sept. 30, 1915.

Day.	Oct.	Nov.	Dec.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.
1	11	14	14	....	18	84	48	92	9.4	8.9
2	11	14	15	....	17	78	48	104	9.2	8.9
3	12	14	16	....	17	84	47	87	8.9	8.7
4	12	14	14	....	17	96	45	77	8.9	8.7
5	12	14	16	....	17	99	43	67	8.9	8.7
6	13	13	14	....	14	90	38	61	8.9	9.2
7	13	13	....	....	16	87	34	55	8.9	9.6
8	14	13	....	....	17	86	33	49	....	9.6
9	14	13	....	....	17	81	33	43	....	9.2
10	13	13	....	....	18	76	....	41	....	8.9
11	13	13	....	....	18	71	....	38	....	8.9
12	13	13	....	....	18	71	....	37	....	8.9
13	12	13	....	....	18	70	....	38	....	9.2
14	12	14	....	....	20	73	....	38	....	9.2
15	12	14	....	18	21	73	....	33	....	8.5
16	12	13	....	17	22	67	....	28	....	8.0
17	12	13	....	18	22	65	....	26	....	8.0
18	12	14	....	18	22	64	....	24	....	8.2
19	13	13	....	19	21	58	....	21	....	8.2
20	13	14	....	19	21	55	....	18	....	8.0
21	14	15	....	19	22	58	....	17	....	8.0
22	14	16	....	19	24	62	139	16	....	8.2
23	14	15	....	18	28	66	144	14	....	8.7
24	14	13	....	18	33	63	146	14	....	8.7
25	14	13	....	19	41	59	149	13	....	....
26	14	14	....	20	60	54	142	12	....	....
27	14	14	....	18	66	45	130	11	7.6	....
28	14	13	....	18	72	41	122	11	7.9	....
29	14	14	....	....	91	41	118	10	8.2	....
30	14	16	....	....	104	46	110	9.6	8.5	....
31	14	....	....	....	94	....	94	....	8.7	....

NOTE.—No gage height record received Oct. 9-13, May 2, 10-21, July 8-26, 28, or 29. Discharge interpolated Oct. 9-13, May 2, July 28 and 29. Discharge May 10-21 estimated at 80 second-feet and July 8-26 at 8.2 second-feet.

Monthly discharge of Shoshone Creek near San Jacinto, Nev., for the year ending Sept. 30, 1915.

Month.	Discharge in second-feet.			Run-off (total in acre-feet).	Accuracy.
	Maximum.	Minimum.	Mean.		
October	14	11	13.0	799	C.
November	16	13	13.7	815	C.
December 1-6	16	14	14.8	176	C.
February 15-28	20	17	18.4	511	B.
March	104	14	32.5	2,000	B.
April	99	41	68.8	4,090	B.
May	149	....	84.6	5,200	C.
June	104	9.6	36.8	2,190	B.
July	....	....	8.38	515	C.
August 1-24	9.6	8.0	8.71	415	C.

CEDAR CREEK NEAR ROSEWORTH, IDAHO.

Location.—In sec. 12, T. 14 S., R. 13 E., 200 yards upstream from dam site of West End Twin Falls Irrigation Co., 10 miles south of Roseworth, Twin Falls County, and 12 miles above mouth of creek. House Creek, the principal tributary of Cedar Creek, enters 2½ miles above gage.

Drainage area.—Not measured.

Records available.—May 30, 1909, to December 16, 1914, when station was temporarily discontinued.

Gage.—Vertical staff on right bank, in two sections; high-water section, reading from 4.6 to 7.5 feet, was installed May 3, 1912. Gage read by Frank Clark.

Discharge measurements.—Made by wading or from a plank footbridge near gage.

Channel and control.—Bed consists of sand and gravel; shifting. During summer months stage-discharge relation is often seriously affected by growth of aquatic plants.

Extremes of discharge.—Maximum stage recorded during period, 2.35 feet October 11–12 (discharge, 28 second-feet); minimum stage recorded, 1.92 feet December 11 (discharge, 17 second-feet).

1909–1914: Maximum stage recorded, 5.2 feet March 5, 1913 (discharge, 167 second-feet); on March 1, 1910, water was above gage and discharge for day was estimated at 200 second-feet; minimum stage recorded, 1.85 feet August 27, 1910, and August 23 and 25, 1911 (discharge, 8 second-feet).

Winter flow.—Stage-discharge relation not seriously affected by ice; open water rating curves assumed applicable except for short periods.

Diversions.—Several small ranch diversions are made above the gage.

Regulation.—None.

Accuracy.—Stage-discharge relation not permanent. Rating curve fairly well defined. Daily discharge ascertained by applying gage heights to rating table. Records good.

The following discharge measurement was made by A. W. Harrington: October 2, 1914: Gage height, 2.04 feet; discharge, 20.3 second-feet.

Daily discharge, in second-feet, of Cedar Creek near Roseworth, Idaho, for the period Oct. 1 to Dec. 16, 1914.

Day.	Oct.	Nov.	Dec.	Day.	Oct.	Nov.	Dec.	Day.	Oct.	Nov.	Dec.
1	20	20	18	11	28	23	17	21	26	23	......
2	21	20	20	12	28	24	18	22	24	20	......
3	24	20	20	13	27	23	18	23	24	20	......
4	24	19	20	14	27	24	18	24	23	20	......
5	26	19	20	15	26	23	18	25	23	19	......
6	26	20	20	16	26	23	18	26	24	20	......
7	26	20	18	17	27	23	......	27	23	20	......
8	27	23	18	18	26	23	......	28	21	20	......
9	27	21	18	19	26	24	......	29	23	20	......
10	27	23	18	20	24	24	......	30	21	21	......
								31	20	......	......

Note.—Discharge Dec. 14–16 estimated on account of effect of ice.

Monthly discharge of Cedar Creek near Roseworth, Idaho, for the period Oct. 1 to Dec. 16, 1914.

Month.	Discharge in second-feet.			Run-off (total in acre-feet).	Accuracy.
	Maximum.	Minimum.	Mean.		
October	28	20	24.7	1,520	B.
November	24	19	21.4	1,270	B.
December, 1–16	20	17	18.6	590	C.
The period				3,380	

BIG WOOD RIVER AT HAILEY, IDAHO.

Location.—In sec. 9, T. 2 N., R. 18 E., at steel highway bridge one-fourth mile southwest of Hailey, Blaine County.

Drainage area.—640 square miles (measured on topographic maps).

Records available.—June 11 to September 30, 1915.

Gage.—Inverted stadia board spiked to pile near left abutment of bridge; read by G. C. Hendrickson.

Discharge measurements.—Made from bridge or by wading.

Channel and control.—Channel fairly straight above and below station. Banks low, covered with light brush, and subject to overflow at high stages, when river may flow in from one to three channels, the number depending on the stage. Bed consists of coarse gravel and sand; clean. Low-water control consists of sheet piling used to protect a water main crossing river; high-water control subject to shift but permanent during 1915. Point of zero flow, determined August 5, 1915, gage height 5.7 feet.

Extremes of discharge.—Maximum stage recorded during year, 3.23 feet June 25 (discharge, 883 second-feet); minimum stage recorded, 4.88 feet September 29–30 (discharge, 21 second-feet).

Winter flow.—No information.

Diversions.—Only a few small diversions for irrigation are made above the station. The Hailey power plant, half a mile upstream, utilizes as a tailrace a natural channel on the east side of the river known as Big Wood Slough; a large amount of water diverted from main channel in this manner is returned to river below station. A record of the flow of Big Wood Slough is obtained, and the total flow of Big Wood River is represented by the amount of water passing both stations.

Regulation.—Variation in the amount of water used at the power plant causes some diurnal fluctuation in flow passing the gage. Observations on the river and on Big Wood Slough are taken practically at the same hour each day, so that the effect of regulation is probably eliminated.

Accuracy.—Stage-discharge relation practically permanent. Rating curve well defined for low and medium stages. Gage read to hundredths daily. Daily discharge ascertained by applying gage heights to rating table. Records good.

Cooperation.—Gage-height record furnished and most of the discharge measurements made by the Idaho Irrigation Co.

For record of Big Wood Slough see page 110.

Discharge measurements of Big Wood River at Hailey, Idaho, during the year ending Sept. 30, 1915.

Date.	Made by—	Gage height.	Discharge.	Date.	Made by—	Gage height.	Discharge.
		Feet.	*Sec.-ft.*			*Feet.*	*Sec.-ft.*
June 11	Crosby [a] and Beebe [a].	3.44	751	Aug. 3	Harrington and Crosby [a]	4.52	119
17	L. Crosby [a]	3.57	614	5	A. W. Harrington	4.54	116
July 7	do	3.52	677	9	L. Crosby [a]	4.59	96.1
12	do	3.84	448	16	Crosby [a] and Denecke [a]	4.68	68.0
19	do	4.16	276	Sept. 2	L. Crosby [a]	4.70	63.4
24	do	4.28	217	2	do	4.71	61.4
29	do	4.44	147				

[a] Employee of the Idaho Irrigation Co.

Daily discharge, in second-feet, of Big Wood River at Hailey, Idaho, for the year ending Sept. 30, 1915.

Day.	June.	July.	Aug.	Sept.	Day.	June.	July.	Aug.	Sept.
1	....	644	140	40	16	644	355	69	66
2	....	609	136	66	17	644	306	66	53
3	....	644	124	53	18	644	296	66	40
4	....	609	121	48	19	644	281	66	40
5	....	679	114	46	20	644	256	66	40
6	....	609	107	46	21	644	247	66	40
7	....	716	104	43	22	716	228	66	40
8	....	542	104	43	23	752	238	66	43
9	....	576	96	43	24	790	224	66	38
10	....	576	96	40	25	868	233	66	43
11	716	478	96	40	26	644	228	66	38
12	679	510	87	40	27	542	201	66	38
13	609	510	84	40	28	542	193	43	25
14	576	478	69	40	29	576	155	43	21
15	576	388	69	40	30	609	144	40	21
					31	....	142	40	....

NOTE.—Discharge interpolated July 31 and Sept. 17.

Monthly discharge of Big Wood River at Hailey, Idaho, for the year ending Sept. 30, 1915.

Month.	Discharge in second-feet.			Run-off (total in acre-feet).	Accuracy.
	Maximum.	Minimum.	Mean.		
June 11-30	868	542	653	25,900	B.
July	716	142	397	24,400	A.
August	140	40	80.9	4,970	A.
September	66	21	41.8	2,490	A.
The period	....	....	....	57,800	

BIG WOOD RIVER NEAR BELLEVUE, IDAHO.

LOCATION.—In sec. 20, T. 1 S., R. 18 E., three-fourths mile below Blair's ranch 1¼ miles above flow line of Magic reservoir, and 10 miles southwest of Bellevue. Blaine County. Camas Creek enters the reservoir about 3 miles below station.

DRAINAGE AREA.—823 square miles (measured on topograhic and Land Office maps).

RECORDS AVAILABLE.—July 6, 1911, to September 30, 1915.

GAGE.—Lallie water-stage recorder in wooden shelter on right bank; outside vertical staff gage at same section. Staff gage read daily by the Idaho Irrigation Co. in addition to the record obtained from the Lallie recorder.

DISCHARGE MEASUREMENTS.—Made by wading or from cable about 30 feet above the gage.

CHANNEL AND CONTROL.—Control is coarse gravel; shifts at times. Banks are clean and may be overflowed in extremely high stages.

EXTREMES OF DISCHARGE.—Maximum stage during year, from Lallie recorder, 2.58 feet at 8 p. m. May 24 (discharge, 751 second-feet); minimum stage recorded, 0.73 foot at 10 a. m. December 20 (discharge, 69 sceond-feet).

1911–1915: Maximum stage recorded, 9.2 feet, May 18, 1911 (discharge, 5,070 second-feet); minimum stage recorded, 0.69 foot, August 21, 1914 (discharge, 64 second-feet).

WINTER FLOW.—Record temporarily discontinued during winter.

DIVERSIONS.—Numerous small diversions are made for irrigation in the vicinity of Bellevue and Hailey. Flood waters are stored in the Magic reservoir of the Idaho Irrigation Co. Magic dam is about 9 miles downstream.

Regulation.—None.

Accuracy.—Stage-discharge relation not permanent. Two well-defined rating curves used, one applicable October 1 to December 28 and the other March 1 to September 30. Staff gage read to hundredths once daily. Mean daily gage heights obtained by inspecting recorder graph used November 6–19 and April 26 to August 29. Daily discharge ascertained by applying gage heights to rating table. Records good.

Cooperation.—Gage-height record furnished and most of the discharge measurements made by the Idaho Irrigation Co.

Discharge measurements of Big Wood River near Bellevue, Idaho, during the year ending Sept. 30, 1915.

Date.	Made by—	Gage height.	Discharge.	Date.	Made by—	Gage height.	Discharge.
		Feet.	*Sec.-ft.*			*Feet.*	*Sec.-ft.*
April 26	Crosby and Hall	1.94	376	July 2	L. Crosby	2.03	433
May 7	Wilkie and Crosby	2.10	461	8	.....do	2.13	481
7	Wilkie and Badley	2.10	472	13	.....do	1.89	341
17	Crosby and Denecke	2.33	593	19	.....do	1.40	179
28	Baldwin and Crosby	2.30	578	29	.....do	1.16	126
June 17	L. Crosby	1.85	342	Aug. 6	Harrington and Crosby	1.16	133
26	Crosby and Denecke	1.98	396	17	Crosby and Denecke	1.05	106

Note.—All of the above with the exception of Baldwin and Harrington were employees of the Idaho Irrigation Co., or of the Idaho State engineer.

Daily discharge, in second-feet, of Big Wood River near Bellevue, Idaho, for the year ending Sept. 30, 1915.

Day.	Oct.	Nov.	Dec.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.
1	162	233	175	89	126	578	620	369	131	92
2	158	236	172	91	128	590	688	393	129	101
3	162	236	172	92	133	566	620	364	133	93
4	160	236	168	95	137	526	520	388	133	91
5	158	233	160	92	148	504	444	379	129	99
6	153	230	158	88	172	482	413	403	124	99
7	151	227	160	85	185	460	384	434	117	101
8	153	224	148	99	185	434	350	476	113	102
9	153	227	135	95	174	418	403	449	119	104
10	153	227	137	102	185	455	429	434	113	99
11	155	230	140	107	188	504	418	374	119	101
12	155	230	133	112	199	537	384	369	124	102
13	155	224	127	115	208	561	360	350	119	104
14	153	230	121	115	241	590	324	337	122	109
15	151	222	117	119	260	620	303	294	120	107
16	151	199	104	117	278	590	315	263	120	105
17	158	202	87	119	319	584	324	231	112	102
18	191	202	79	98	364	620	307	202	117	99
19	207	188	71	93	364	694	311	182	115	95
20	216	184	69	91	388	700	298	164	113	91
21	227	180	76	92	439	675	303	164	115	88
22	224	178	79	89	465	632	315	199	112	88
23	224	178	95	91	439	663	332	182	112	91
24	230	180	102	101	413	700	350	154	112	93
25	233	183	106	104	388	700	403	146	112	96
26	233	183	109	107	364	644	408	141	109	99
27	239	183	117	110	346	578	324	131	107	99
28	236	180	133	117	360	566	286	126	104	96
29	230	183	....	124	374	596	298	120	101	93
30	236	172	....	124	460	584	324	119	96	91
31	236	....	....	126	....	584	....	129	95	......

Note.—Discharge interpolated Nov. 20, Sept. 11, 12, 15, 19, 23, and 24 on account of lack of gage heights. No record obtained Dec. 29 to Feb. 28.

Monthly discharge of Big Wood River near Bellevue, Idaho, for the year ending Sept. 30, 1915.

Month.	Discharge in second-feet.			Run-off (total in acre-feet).	Accuracy.
	Maximum.	Minimum.	Mean.		
October	239	151	187	11,500	B.
November	236	172	207	12,300	B.
December 1-28	175	69	123	6,830	B.
March	126	85	103	6,330	B.
April	465	126	281	16,700	B.
May	700	418	579	35,600	A.
June	688	286	385	22,900	A.
July	476	119	273	16,800	A.
August	133	95	116	7,130	A.
September	109	88	97.7	5,810	B.

BIG WOOD RIVER BELOW MAGIC DAM, NEAR RICHFIELD, IDAHO.

LOCATION.—In sec. 18, T. 2 S., R. 18 E, Blaine County, half a mile below the Magic dam of the Idaho Irrigation Co., and 18 miles northwest of Richfield. No tributaries between dam and station.

DRAINAGE AREA.—Not measured.

RECORDS AVAILABLE.—April 19, 1911, to September 30, 1915.

GAGE.—Lallie water-stage recorder on right bank; referred to an outside vertical staff.

DISCHARGE MEASUREMENTS.—Made by wading or from a cable about 10 feet above the gage.

CHANNEL AND CONTROL.—Bed of stream and control composed of clean, coarse gravel and small boulders; somewhat shifting.

EXTREMES OF DISCHARGE.—Maximum stage recorded during year, 4.49 feet June 16 and 22 (discharge, 1,180 second-feet); "zero discharge" reported February 3 by Lothrop Crosby, of the Idaho Irrigation Co.

1911–1915: Maximum stage recorded, 9.2 feet May 18, 1911 (discharge, 5,070 second-feet); "zero discharge" reported February 3, 1915.

WINTER FLOW.—Records discontinued during winter; winter discharge estimated by Lothrop Crosby, of the Idaho Irrigation Co., from record of gate openings at Magic dam.

DIVERSIONS.—No diversions are made by the Idaho Irrigation Co. above this station but numerous ranch diversions are made in the upper drainage basin, the largest quantity of water probably being used in the district around Hailey. Flood waters are stored in the Magic reservoir, just above the station, and the first diversion by the company is the Richfield canal about 2 miles below.

REGULATION.—Flow past station completely regulated by gates in outlet tunnel at Magic dam.

ACCURACY.—Stage-discharge relation not permanent. Rating curve fairly well defined October 1 to November 2, November 10–29, and December 7–15; well defined curve used March 27 to September 30. Mean daily gage heights obtained by inspecting recorder graph. Daily discharge ascertained by applying daily gage heights to rating table. Open-water records good; winter records fair.

COOPERATION.—Gage-height record and estimates of flow December 16 to March 26 furnished by the Idaho Irrigation Co., which also made most of the discharge measurements.

Discharge measurements of Big Wood River below Magic dam, near Richfield, Idaho, during the year ending Sept. 30, 1915.

Date.	Made by—	Gage height.	Discharge.	Date.	Made by—	Gage height.	Discharge.
		Feet.	*Sec-ft.*			*Feet.*	*Sec.-ft.*
Apr. 14	Crosby and Hall	3.22	410	July 20	L. Crosby	4.02	879
26	.....do	3.87	771	30	Crosby and Lisle	3.38	475
May 17	Crosby and Denecke	2.76	232	31	.....do	3.21	403
28	G. C. Baldwin	3.26	425	31	L. Crosby	2.93	292
June 12	Crosby and Beebe	4.20	1,020	Aug. 7	Harrington and Crosby	2.80	247
24	Crosby and Denecke	4.46	1,160	Sept. 3	L. Crosby	2.19	96.7
July 9	Crosby and Lisle	3.11	350	13	S. E. Vance, jr	2.18	93.9
10	.....do	2.96	298				
12	.....do	2.68	201				

NOTE.—Baldwin and Harrington are engineers of the Geological Survey, S. E. Vance, jr., assistant to the State engineer, and the other men employees of the Idaho Irrigation Co.

Daily discharge, in second-feet, of Big Wood River below Magic dam, near Richfield, Idaho, for the year ending Sept. 30, 1915.

Day.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.
1	110	98	223	......	92	......	176	732	455	1,100	284	96
2	98	98	217	......	46	......	174	605	480	1,090	281	96
3	97	98	217	......	0	......	182	548	522	1,080	277	96
4	97	98	217	......	46	......	192	527	522	1,080	277	98
5	97	98	217	......	......	......	195	527	537	1,080	260	92
6	97	98	217	......	......	25	195	543	543	1,070	243	93
7	97	98	217	......	......	......	195	554	571	1,070	243	93
8	97	98	217	......	......	......	228	617	623	1,060	240	93
9	97	98	214	......	......	......	263	640	664	791	234	92
10	97	83	214	......	......	53	292	652	752	296	243	92
11	97	92	211	......	......	61	330	652	894	212	260	93
12	97	106	211	......	......	51	372	407	1,040	206	253	93
13	97	106	211	......	85	42	398	274	1,060	334	253	95
14	98	106	209	......	......	63	412	231	1,160	929	246	95
15	98	106	209	......	......	123	436	204	1,160	1,030	243	154
16	98	106	......	......	......	135	495	204	1,180	1,070	240	204
17	98	106	......	......	......	......	571	228	1,180	1,030	234	204
18	98	106	......	115	64	......	646	182	1,180	999	228	192
19	98	106	......	100	58	72	683	212	1,170	929	221	182
20	98	106	......	......	51	84	832	257	1,160	887	228	126
21	98	106	......	......	......	......	832	281	1,160	839	270	107
22	98	106	......	......	......	......	752	346	1,180	805	260	103
23	98	117	......	......	......	......	752	426	1,180	791	237	102
24	98	206	......	......	......	......	752	431	1,160	784	221	100
25	98	229	......	......	......	......	765	422	1,120	791	240	98
26	98	229	......	......	......	......	778	407	1,100	798	243	105
27	98	226	......	......	......	145	805	426	1,100	752	159	116
28	93	229	......	......	......	174	798	426	1,110	726	90	116
29	98	229	......	......	......	218	798	426	1,100	611	90	78
30	98	229	......	......	......	231	805	426	1,100	490	92	54
31	98	......	......	......	......	204	......	440	......	334	93	......

NOTE.—Discharge Nov. 3-9, Nov. 30 to Dec. 6, and Dec. 16 to Mar. 26 estimated by engineers of the Idaho Irrigation Co. from record of gate openings at dam as shown in above table and as follows: Dec. 16-21, 250 second-feet, Dec. 22-26, 300 second-feet; Dec. 27-31, 290 second-feet; Jan. 1-17, 254 second-feet; Jan. 20-31, 78 second-feet; Feb. 5-12, 92 second-feet; Feb. 14-17, 74 second-feet; Feb. 21 to Mar. 5, 40 second-feet: Mar. 7-9, 37 second-feet; Mar. 17 and 18, 67 second-feet; Mar. 21-23, 142 second-feet; Mar. 24-26, 144 second-feet.

Monthly discharge of Big Wood River below Magic dam, near Richfield, Idaho, for the year ending Sept. 30, 1915.

Month.	Discharge in second-feet.			Run-off (total in acre-feet).	Accuracy.
	Maximum.	Minimum.	Mean.		
October	110	97	98.0	6,030	B.
November	229	83	131	7,800	B.
December	....	209	247	15,200	C.
January	....	....	176	10,800	C.
February	....	0	64.1	3,560	C.
March	231	....	96.3	5,920	C.
April	832	174	503	29,900	A.
May	732	182	428	26,300	A.
June	1,180	455	939	55,900	A.
July	1,100	206	809	49,700	A.
August	284	90	225	13,800	A.
September	204	54	112	6,660	A.
The year	1,180	0	320	232,000	

NOTE.—See foot-note to table of daily discharge.

BIG WOOD RIVER BELOW NORTH GOODING CANAL, NEAR SHOSHONE, IDAHO.

LOCATION.—In sec. 15, T. 4 S., R. 18 E., 300 yards below head of North Gooding canal, 13 miles northeast of Shoshone, Lincoln County and about 14 miles below the Magic dam.

DRAINAGE AREA.—Not measured.

RECORDS AVAILABLE.—January 1, 1911, to September 30, 1915.

GAGE.—Vertical staff on left bank.

DISCHARGE MEASUREMENTS.—Made by wading or from cable 100 feet below gage.

CHANNEL AND CONTROL.—Channel is cut in lava rock Stream bed rough. Control somewhat shifting. On account of rough cross section and irregular velocities conditions for making measurements are poor.

EXTREMES OF DISCHARGE.—Maximum stage recorded during the year, 9.4 feet at 7 p. m. July 11 (discharge, 242 second-feet); minimum stage recorded, 7.48 feet September 25 and 27 (discharge, 22 second-feet).

1911–1915: Maximum stage recorded, 15.0 feet May 18, 1911 (discharge, 3,180 second-feet); minimum stage recorded 1.22 feet February 14, 1911 (discharge, zero). Zero discharge also recorded February 9–13 and March 5–6, 1911, and October 19–20 and 26, 1912.

WINTER FLOW.—Observations discontinued during the winter.

DIVERSIONS.—Station is below all diversions of the Idaho Irrigation Co. The North Gooding and Richfield canals divert between the station and the Magic dam.

REGULATION.—Flow past station is regulated by gates at Magic dam and by the head gates of the North Gooding and Richfield canals.

ACCURACY.—Stage-discharge relation practically permanent during 1915. Rating curve fairly well defined. Gage read to hundredths twice daily during irrigation season. Daily discharge ascertained by applying mean daily gage heights to rating table. Records good.

COOPERATION.—Gage-height record furnished and part of discharge measurements made by Idaho Irrigation Co.

Discharge measurements of Big Wood River below North Gooding canal, near Shoshone, Idaho, during the year ending Sept. 30, 1915.

Date.	Made by—	Gage height.	Discharge.	Date.	Made by—	Gage height.	Discharge.
		Feet.	*Sec.-ft.*			*Feet.*	*Sec.-ft.*
May 27	Baldwin and Crosby.	8.30	84.9	Aug. 7	Harrington and Crosby	8.20	80.4
27	.....do	8.30	94.0	26	L. Crosby	8.00	58.2
July 17	L. Crosby	8.80	144	Sept. 22	.....do	7.57	27.1
21	.....do	8.56	116				

NOTE.—L. Crosby was an employee of the Idaho Irrigation Co.

Daily discharge, in second-feet, of Big Wood River, below North Gooding canal, near Shoshone, Idaho, for the year ending Sept. 30, 1915.

Day.	Nov.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.
1				110	84	121	58	64
2				99	84	121	74	64
3				89	89	121	64	64
4				94	84	121	69	69
5				79	89	121	79	64
6				79	89	121	79	64
7				84	84	127	79	64
8				79	89	139	79	64
9				94	79	145	69	64
10				99	89	145	69	60
11				89	99	186	69	60
12			69	94	94	30	69	60
13			62	79	99	110	64	60
14			55	79	99	158	69	64
15			48	60	104	145	64	58
16			69	44	104	172	59	55
17			69	44	110	145	60	56
18			110	47	110	145	58	50
19			110	26	110	139	58	33
20	72		104	44	110	145	56	30
21			99	69	110	116	60	29
22			110	84	116	110	60	28
23			121	99	145	89	59	24
24			121	99	145	89	60	23
25	62		121	99	145	89	60	22
26			110	99	110	89	58	28
27			116	89	110	89	48	22
28			127	94	99	89	60	23
29			116	89	99	89	64	23
30		52	116	89	99	84	64	22
31				94		79	64	

NOTE.—Discharge Nov. 20 and 25 determined from rating curve applicable during 1914. Discharge interpolated Apr. 13, 14, 22, and May 22, on account of lack of gage heights. No record obtained during months of October, December, January, February and Apr. 1-11.

Monthly discharge of Big Wood River below North Gooding canal, near Shoshone, Idaho, for the year ending Sept. 30, 1915.

Month.	Discharge in second-feet.			Run-off (total in acre-feet).	Accuracy.
	Maximum.	Minimum.	Mean.		
April 12-30	127	48	97.5	3,680	B.
May	110	26	81.2	4,990	B.
June	145	79	103	6,130	B.
July	186	30	118	7,260	B.
August	79	48	64.6	3,970	B.
September	69	22	47.0	2,800	B.
The period				28,800	

BIG WOOD SLOUGH AT HAILEY, IDAHO.

Location.—In sec. 9, T. 2 N., R. 18 E., at highway bridge about one-eighth mile northeast of the steel highway bridge across Big Wood River and one-eighth mile southwest of Hailey, Blaine County.

Records available.—June 11 to September 30, 1915.

Gage.—Inverted stadia board spiked to center pile on downstream side of highway bridge; read by G. C. Hendrickson.

Discharge measurements.—Made from bridge or by wading.

Channel and control.—Bed composed of sand and gravel. Banks covered with brush and subject to overflow. One channel at all stages. Control consists of top of a wood-stave water pipe laid in bed of stream about 15 feet below gage.

Extremes of discharge.—Maximum stage recorded during year, 1.64 feet July 9 (discharge, 207 second-feet); minimum stage recorded, 2.03 feet August 27 (discharge, 117 second-feet).

Winter flow.—No information.

Diversions.—None.

Regulation.—Amount of water passing gage affected by load at power plant half a mile upstream and there is considerable diurnal fluctuation. River is affected inversely by any such regulation, so that the accuracy of the summation of the two records is presumably affected only slightly by this factor.

Accuracy.—Stage-discharge relation practically permanent: Rating curve well defined. Gage read to hundredths once daily. Daily discharge ascertained by applying daily gage heights to rating table. Records good.

Cooperation.—Gage-height record furnished and part of the discharge measurements made by the Idaho Irrigation Co.

Big Wood Slough is a natural channel of Big Wood River that is utilized also as a tailrace for the Hailey power plant. The record at this station represents a portion of the natural flow of Big Wood River and taken in conjunction with the record at the nearby station on the river will show the total flow of the river at this point. For record of station on the river see page 103.

Discharge measurements of Big Wood Slough at Hailey, Idaho, during the year ending Sept. 30, 1915.

Date.	Made by—	Gage height.	Discharge.	Date.	Made by—	Gage height.	Discharge.
		Feet.	*Sec.-ft.*			*Feet.*	*Sec.-ft.*
June 11	Crosby[a] and Beebe[a].	1.79	183	Aug. 9	L. Crosby	1.92	140
Aug. 3	Harrington and Crosby[a]	1.81	161	16	Crosby[a] and Denecke[a]	1.99	125

[a] Employee of the Idaho Irrigation Co.

Note.—Aug. 3, A. W. Harrington estimated point of zero flow to be at gage height 3.4 feet.

Daily discharge, in second-feet, of Big Wood Slough at Haily, Idaho, for the year ending Sept. 30, 1915.

Day.	June.	July.	Aug.	Sept.	Day.	June.	July.	Aug.	Sept.
1	....	165	174	128	16	165	156	128	146
2	....	156	174	165	17	165	165	128	142
3	....	165	165	156	18	165	165	128	137
4	....	165	165	156	19	156	165	128	137
5	....	156	156	146	20	165	165	128	137
6	....	165	156	146	21	156	165	128	137
7	....	165	156	137	22	165	156	128	137
8	....	174	156	137	23	165	146	128	128
9	....	194	146	137	24	165	146	128	128
10	....	174	137	146	25	174	137	128	128
11	165	165	128	137	26	156	146	128	146
12	165	165	128	187	27	156	156	123	146
13	156	165	128	174	28	146	156	137	146
14	156	165	137	146	29	156	165	146	146
15	165	165	137	146	30	156	174	137	156
					31	....	174	128	....

NOTE.—Discharge interpolated Sept. 17.

Monthly discharge of Big Wood Slough at Hailey, Idaho, for the year ending Sept. 30, 1915.

Month.	Discharge in second-feet.			Run-off (total in acre-feet).
	Maximum.	Minimum.	Mean.	
June 11-30	174	146	161	6,390
July	194	137	163	10,000
August	174	123	139	8,550
September	174	128	143	8,510
The period				33,400

CAMAS CREEK[1] NEAR BLAINE, IDAHO.

LOCATION.—In sec. 15, T. 1 S., R. 16 E., Blaine County, 500 feet below the sheep bridge, one-fourth mile north of Coyote Springs siding on the Central Idaho branch of the Oregon Short Line, 1½ miles below the Malad bridge of the Central Idaho Railroad, 2½ miles above backwater of the Magic reservoir, and 4 miles southeast of Blaine. No tributaries or diversions between station and Magic reservoir.

DRAINAGE AREA.—Not measured.

RECORDS AVAILABLE.—May 9, 1912, to September 30, 1915, and results of discharge measurements made in 1911 by the Idaho Irrigation Co.

GAGE.—Lallie water-stage recorder on left bank.

DISCHARGE MEASUREMENTS.—Made from the sheep bridge or by wading.

CHANNEL AND CONTROL.—One channel at all stages. Bed of stream rocky. Control practically permanent except for extreme low stages. Stage of zero flow estimated August 6 at gage height 0.60 foot.

EXTREMES OF DISCHARGE.—Maximum stage recorded during year, 4.33 feet about March 24, reported by L. Crosby, of the Idaho Irrigation Co., from position of flood marks (discharge, 644 second-feet); minimum stage recorded, 1.00 foot at 12.45 p. m. September 2 (discharge, 2.5 second-feet).

1911-1915: Maximum stage recorded, 10.73 feet at 4 p. m. April 8, 1914 (discharge by measurement, 3,850 second-feet); minimum stage recorded September 2, 1915.

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[1] Not Malad River; revision of previous decision of United States Geographic Board.

Winter flow.—Records are discontinued during the winter.

Diversions.—Many small diversions are made above the station.

Regulation.—None.

Accuracy.—Stage-discharge relation not permanent; changed during the winter of 1914–15. Two fairly well defined rating curves used, one applicable October 1 to November 23 and the other April 14 to September 30. Gage-height record fragmentary. Mean daily gage heights obtained by inspecting recorder graph. Daily discharge ascertained by applying mean daily gage heights to rating table. Records good for October, November, and May; poor for June and July owing to interpolations necessary because of fragmentary gage-height record.

Cooperation.—Gage-height record furnished and part of discharge measurements made by the Idaho Irrigation Co.

Discharge measurements of Camas Creek near Blaine, Idaho, during the year ending Sept. 30, 1915.

Date.	Made by—	Gage height.	Discharge.	Date.	Made by—	Gage height.	Discharge.
		Feet.	*Sec.-ft.*			*Feet.*	*Sec.-ft.*
Apr. 14	Crosby and Hall	2.56	127	Aug. 6	Harrington and Crosby	1.11	5.1
27	do	2.31	87.9	17	Crosby and Denecke	1.01	2.8
May 27	Baldwin and Crosby	2.40	109				

Note.—Crosby, Hall, and Denecke were employees of the Idaho Irrigation Co.

Daily discharge, in second-feet, of Camas Creek near Blaine, Idaho, for the year ending Sept. 30, 1915.

Day.	Oct.	Nov.	Apr.	May.	June.	July	Aug.	Sept.
1	15	24			51	11		
2	15	23			50	10		2.5
3	18	24			48	10		
4	19	23			47	9		
5	18	23			45	9		
6	15	23			44	8	5	
7	16	23			42	11		
8	16	23		93	40	9		
9	16	23			39	9		
10	18	23			37	9		
11	18	23			36	9		
12	17	23			34	8		
13	16	23			32	8		
14	17	23	128		30	8		
15	16	23			28	8		
16	16	23			26	7		
17	18	23			26	7	3	
18	23	23		107	26	6		
19	25	23		112	26	6		
20	23	23		117	26	5		
21	27	23		122	26	5		
22	32	22		125	24	5		
23	32	23		124	22	5		
24	32			122	20	5		
25	31			116	19	5		
26	29			110	16	5		
27	25		91	104	14	5		
28	24			103	12	5		
29	23			93	12	5		
30	24			86	11	5		
31	23			69		5		

Note.—Discharge interpolated May 19, 20, 25, 26, June 2–13, 19, 20, June 29 to July 5, July 9–14, 16–19 22–27, 30, and 31.

Monthly discharge of Camas Creek near Blaine, Idaho, for the year ending Sept. 30, 1915.

Month.	Discharge in second-feet.			Run-off (total in acre-feet).	Accuracy.
	Maximum.	Minimum.	Mean.		
October	32	15	21.2	1,300	B.
November 1-23	24	22	23.0	1,050	B.
May 18-31	125	69	108	3,000	B.
June	51	11	30.3	1,800	D.
July	11	5	7.16	440	

LITTLE WOOD RIVER NEAR RICHFIELD, IDAHO.

Location.—In sec. 30, T. 4 S., R. 20 E., half a mile above head of the Dietrich canal of the Idaho Irrigation Co. and about a mile east of the railroad station at Richfield, Lincoln County.

Drainage area.—Not measured.

Records available.—January 1, 1911, to September 30, 1915.

Gage.—Vertical staff on right bank.

Discharge measurements.—Made by wading or from a suspension footbridge a few feet below the gage.

Channel and control.—Bed composed of coarse gravel and small rocks; rough. Control probably permanent. Stage-discharge relation may be slightly affected during summer months by a light growth of aquatic plants.

Extremes of discharge.—Maximum stage recorded during the year, 2.90 feet May 26 and 30 (discharge, 169 second-feet); minimum stage recorded, 2.15 feet June 13 (discharge, 45 second-feet).

1911–1915: Maximum stage recorded, 4.5 feet May 17 and 18, 1911 (discharge, 722 second-feet); minimum stage recorded, 2.06 feet June 23, 1912 (discharge, 35 second-feet).

Winter flow.—Stage-discharge relation greatly affected by ice. No records obtained during winter of 1914-15.

Diversions.—Small ditches serving ranches divert water above station. The Dietrich canal of the Idaho Irrigation Co. diverts a short distance below.

Regulation.—None.

Accuracy.—Stage-discharge relation practically permanent. Rating curve fairly well defined. Gage read to hundredths once daily. Daily discharge ascertained by applying gage heights to rating table. Records good.

Cooperation.—The Idaho Irrigation Co. furnished gage-height record and made most of the discharge measurements.

Discharge measurement of Little Wood River near Richfield, Idaho, during the year ending Sept. 30, 1915.

Date.	Made by—	Gage height.	Discharge.	Date.	Made by—	Gage height.	Discharge.
		Feet.	*Sec.-ft.*			*Feet.*	*Sec.-ft.*
Apr. 12	Crosby and Hall	2.67	132	May 29	G. C. Baldwin	2.81	150
23	do	2.46	88	Aug. 3	Harrington and Crosby	2.40	74.6
28	do	2.38	77.6	23	Walker and Denecke	2.43	89.4
May 5	do	2.60	117	23	do	2.43	85.1
25	Crosby and Denecke	2.82	162	Sept. 14	Crosby and Vance	2.63	112

Note.—Crosby, Hall, Denecke, and Walker were employees of the Idaho Irrigation Co.; Vance was an employee of the State engineer.

Daily discharge, in second-feet, of Little Wood River near Richfield, Idaho, for the year ending Sept. 30, 1915.

Day.	Apr.	May.	June.	July.	Aug.	Sept.	Day.	Apr.	May.	June.	July.	Aug.	Sept.
1	....	66	150	55	74	104	16	114	104	62	74	76	122
2	....	78	131	54	78	104	17	110	113	57	72	82	122
3	....	90	113	57	80	104	18	107	113	55	71	83	122
4	....	102	113	61	83	104	19	104	113	58	74	85	122
5	....	113	96	65	91	104	20	100	122	57	74	83	122
6	....	104	91	65	85	104	21	96	131	51	72	83	122
7	....	104	104	77	74	104	22	93	140	51	71	86	113
8	....	104	104	72	78	113	23	90	150	52	71	83	113
9	....	86	78	82	76	113	24	88	150	52	70	85	113
10	....	93	77	88	77	113	25	86	150	54	70	90	113
11	....	104	77	82	78	113	26	82	169	55	66	86	122
12	122	104	57	80	80	113	27	80	169	52	64	93	131
13	122	104	45	80	76	113	28	77	160	55	65	96	140
14	122	104	49	82	76	122	29	78	150	58	66	104	140
15	118	104	65	78	78	122	30	66	169	58	70	96	136
							31	....	160	....	70	104	....

NOTE.—Discharge interpolated, on account of lack of gage heights, Apr. 15-20, 22, 24–27, May 2–4 and 14. No record obtained Oct. 1 to April 11.

Monthly discharge of Little Wood River near Richfield, Idaho, for the year ending Sept. 30, 1915.

Month.	Discharge in second-feet.			Run-off (total in acre-feet).	Accuracy.
	Maximum.	Minimum.	Mean.		
April 12-30	122	66	97.6	3,680	C.
May	169	66	120	7,380	B.
June	150	45	72.6	4,320	B.
July	88	54	70.9	4,360	B.
August	104	74	83.8	5,150	B.
September	140	104	117	6,960	B.
The period	....	....	....	31,800	

BRUNEAU RIVER NEAR ROWLAND, NEV.

LOCATION.—In sec. 29, T. 47 N., R. 56 E., at Hiram Salls's ranch, half a mile below Taylor Creek, 1½ miles above McDonald Creek and Rowland post office, and 100 miles north of Elko, the nearest railroad point.

DRAINAGE AREA.—Not measured.

RECORDS AVAILABLE.—May 19, 1913, to September 30, 1915.

GAGE.—Vertical staff in two sections spiked to left abutment of footbridge; read by Mrs. Hiram Salls.

DISCHARGE MEASUREMENTS.—Made by wading or from footbridge.

CHANNEL AND CONTROL.—Bed consists of gravel. Banks are high but left bank might be overflowed by extremely high stages. Control is a well-defined gravel riffle; practically permanent. Point of zero flow September 1, 1915, 1.0 foot ±0.1 foot.

EXTREMES OF DISCHARGE.—Maximum stage recorded during the year, 3.25 feet May 20, 21, and June 1 (discharge, 271 second-feet); minimum stage, 1.50 feet August 30 and 31 (discharge, 6.5 second-feet).

1913–1915: Maximum stage recorded, 5.8 feet April 17, 1914 (discharge, 972 second-feet); minimum stage recorded August 30 and 31, 1915.

WINTER FLOW.—Stage-discharge relation not seriously affected by ice but estimates for short periods are based on observer's notes and weather records.

Diversions.—A few small ditches serving ranches divert water above station.

Regulation.—None.

Accuracy.—Stage-discharge relation practically permanent; affected by ice January 7–23. Rating curve well defined. Gage read to quarter-tenths twice daily. Daily discharge ascertained by applying gage heights to rating table. Records good.

Discharge measurements of Bruneau River near Rowland, Nev., during the year ending Sept. 30, 1915.

[Made by A. B. Purten.]

Date.	Gage height.	Discharge.	Date.	Gage height.	Discharge.
	Feet.	*Sec.-ft.*		*Feet.*	*Sec.-ft.*
May 25	3.14	247	May 26	3.08	226
25	3.14	236	Sept. 1	1.52	7.4

Daily discharge, in second-feet, of Bruneau River near Rowland, Nev., for the year ending Sept. 30, 1915.

Day.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.
1	20	29	......	14	27	35	150	171	271	50	14	7.2
2	20	29	......	14	27	33	150	171	259	45	14	7.9
3	24	29	......	14	27	31	192	171	236	45	14	8.2
4	27	27	......	14	27	31	192	160	214	43	14	9.3
5	24	27	......	14	27	27	192	150	192	41	14	9.0
6	24	27	......	14	27	27	192	140	192	41	14	8.6
7	26	27	......	......	27	20	192	130	182	55	13	8.6
8	27	27	......	......	27	19	192	120	171	44	12	8.6
9	27	27	......	......	35	19	182	111	171	40	12	8.6
10	35	27	......	......	31	21	171	107	171	37	12	8.6
11	31	27	......	......	31	26	150	107	171	35	10	8.6
12	27	27	......	......	31	27	171	171	171	35	10	9.3
13	27	27	......	......	27	33	198	171	171	35	10	9.6
14	27	27	......	......	27	35	192	150	160	32	9.3	10
15	27	27	......	......	24	35	182	150	150	27	9.3	12
16	24	27	......	......	24	45	171	140	130	26	9.3	14
17	27	27	......	......	27	58	171	140	130	23	9.3	13
18	27	......	......	......	27	74	182	150	130	20	9.3	12
19	27	......	......	......	27	74	182	182	120	20	9.3	11
20	27	......	......	......	27	83	182	271	107	18	9.3	11
21	35	......	......	......	29	92	214	271	107	19	9.3	11
22	45	......	......	......	29	92	236	259	102	19	8.2	11
23	45	......	......	......	31	111	236	236	94	19	8.2	10
24	40	......	14	25	31	150	214	236	92	19	10	10
25	40	......	14	26	31	171	214	259	88	19	11	16
26	35	......	14	27	33	171	192	236	88	19	10	31
27	35	......	14	27	33	171	171	214	81	18	10	24
28	33	......	14	27	35	150	171	225	72	15	9.6	20
29	33	......	14	27	......	192	171	236	64	14	7.9	18
30	31	......	14	27	......	171	171	214	57	14	6.5	17
31	31	......	14	27	......	150	......	214	......	14	6.5	......

Note.—Gage heights not recorded Nov. 18 to Dec. 23; discharge estimated at 20 second-feet Nov. 18–20 and 15 second-feet Dec. 1–23. Discharge estimated, because of ice, Jan. 7–23, 20 second-feet.

Monthly discharge of Bruneau River near Rowland, Nev., for the year ending Sept. 30, 1915.

Month.	Discharge in second-feet.			Run-off (total in acre-feet).	Accuracy.
	Maximum.	Minimum.	Mean.		
October	45	20	29.9	1,840	A.
November	29		24.2	1,440	C.
December			14.7	904	D.
January		14	20.5	1,260	C.
February	35	24	28.8	1,600	B.
March	192	19	76.6	4,710	A.
April	236	150	186	11,100	A.
May	271	107	183	11,300	A.
June	271	57	145	8,630	A.
July	55	14	29.1	1,790	A.
August	14	6.5	10.5	646	B.
September	31	7.2	12.1	720	B.
The year	271	6.5	63.3	45,900	

BRUNEAU RIVER NEAR HOT SPRING, IDAHO.

LOCATION.—In sec. 34, T. 7 S., R. 6 E., at the Dunham ranch, 1 mile below Hot Creek, 2 miles upstream from Hot Spring post office, Owyhee County, about 13 miles below confluence with East Fork of Bruneau River.

DRAINAGE AREA.—Not measured.

RECORDS AVAILABLE.—July 3, 1909, to March 15, 1915, when station was discontinued.

GAGE.—Vertical staff on right bank near Dunham's house; read by Sid Dunham. Original gage (in use July 3, 1909, to March 1, 1910, inclusive) was a vertical staff on the right bank a quarter of a mile upstream from site of present gage. Relation between the two gages not determined.

DISCHARGE MEASUREMENTS.—Made by wading or from cable at gage.

CHANNEL AND CONTROL.—Bed of stream and control composed of coarse gravel, shifting during floods. One channel at all stages, although right bank may be overflowed in times of flood; left bank rocky and high.

EXTREMES OF DISCHARGE.—Maximum stage recorded during year, 5.21 feet May 1 (discharge, 607 second-feet); minimum stage recorded, 3.7 feet December 10–21 (discharge, 59 second-feet).

1909–1915: Maximum stage recorded, 10.6 feet (on old gage) March 1, 1910 (discharge, 5,660 second-feet); minimum stage recorded, 3.20 feet January 10, 1913 (discharge, 2 second-feet).

WINTER FLOW.—Stage-discharge relation not affected by ice. Hot springs along the river keep the temperature of the water above the freezing point.

DIVERSIONS.—A few small ditches serving ranches divert water from the tributaries of Bruneau River above the gage.

REGULATION.—None.

ACCURACY.—Stage-discharge relation practically permanent October to March. Rating curve fairly well defined. Gage read to half tenths once daily. Daily discharge ascertained by applying daily gage heights to rating table. Records good.

The following discharge measurement was made by A. W. Harrington:

May 1, 1915: Gage height, 5.21 feet; discharge, 607 second-feet.

Daily discharge, in second-feet, of Bruneau River near Hot Spring, Idaho, for the year ending Sept. 30, 1915.

Day.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Day.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.
1....	98	149	98	122	136	149	16....	136	110	59	110	122	....
2....	98	149	76	122	122	149	17....	136	98	59	110	149	....
3....	98	149	76	122	122	149	18....	136	76	59	110	136	....
4....	98	149	110	122	122	149	19....	149	76	59	110	136	....
5....	98	149	122	122	122	149	20....	179	76	59	110	136	....
6....	122	149	110	110	122	149	21....	196	76	59	98	136	....
7....	122	149	76	122	122	149	22....	213	76	68	98	136	....
8....	122	149	76	110	122	122	23....	213	76	122	98	136	....
9....	122	136	136	110	122	122	24....	196	98	122	98	149	....
10....	136	136	59	110	122	122	25....	196	98	122	98	149	....
11....	136	122	59	110	149	149	26....	179	98	122	98	149	....
12....	136	122	59	110	149	136	27....	179	98	76	110	149	....
13....	136	122	59	110	149	136	28....	149	98	76	110	149	....
14....	136	122	59	122	122	149	29....	149	98	122	122	....	....
15....	136	110	59	110	149	149	30....	149	98	122	136	....	....
							31....	149	....	122	136	....	....

Monthly discharge of Bruneau River near Hot Spring, Idaho, for the year ending Sept. 30, 1915.

Month.	Discharge in second-feet.			Run-off (total in acre-feet).	Accuracy.
	Maximum.	Minimum.	Mean.		
October	213	98	145	8,920	B.
November	149	76	114	6,780	B.
December	136	59	85.9	5,280	B.
January	136	98	112	6,890	B.
February	149	122	135	7,500	B.
March 1-15	149	122	142	4,220	B.
The period	....	....	....	39,600	

BRUNEAU RIVER NEAR GRANDVIEW, IDAHO.

Location.—In sec. 1, T. 6 S., R. 4 E., 500 yards below the Grandview dam and the head of the Grandview canal, 1½ miles above mouth of Bruneau River, and 11 miles southeast of Grandview, Owyhee County.

Drainage area.—Not measured.

Records available.—January 1, 1895, to December 31, 1903; May 1, 1909, to September 30, 1915.

Gage.—Vertical staff on left bank; installed March 10, 1910; read by S. A. Mullenix. Gages used prior to March 10, 1910, differed slightly in location and were at a datum 0.87 foot higher than that of present gage.

Discharge measurements.—Made by wading or from cable just above gage.

Channel and control.—Bed and control consist of coarse gravel which shifts during extreme floods. Banks clean. One channel at all stages.

Extremes of discharge.—Maximum stage recorded during year, 4.2 feet at 11 a. m. May 22 (discharge, 1,210 second-feet); minimum stage recorded, 1.9 feet July 31 to August 8 (discharge, 5 second-feet).

1895–1903 and 1909–1915: Maximum stage recorded March 2, 1910, determined by observing position of flood marks, equal to 11.0 feet on present gage (discharge estimated from extension of rating curve, 5,700 second-feet); minimum stage recorded, 1.7 feet August 27 and September 3–7, 1911 (discharge, 1 second-foot).

Winter flow.—Stage-discharge relation not affected by ice, presumably because of the numerous hot springs in the vicinity of Hot Spring and Bruneau.

Diversions.—Grandview canal and Buckaroo ditch are the principal diversions above the station, but a number of small ditches also divert water from the Bruneau and its tributaries for use on ranches.

Regulation.—Practically no water is stored above the station. The Grandview dam, which is a diversion structure only, impounds in its reservoir a relatively small quantity of water.

Accuracy.—Stage-discharge relation practically permanent during the year. Rating curve well defined. Gage read to tenths once daily. Observations October to December not entirely reliable. Daily discharge ascertained by applying daily gage heights to rating table. Records poor October to December, good for rest of year.

Discharge measurements of Bruneau River near Grandview, Idaho, during the year ending Sept. 30, 1915.

[Made by A. W. Harrington.]

Date.	Gage height.	Dis-charge.	Date.	Gage height.	Dis-charge.
	Feet.	*Sec.-ft.*		*Feet.*	*Sec.-ft.*
Apr. 30	3.20	432	Aug. 19	2.00	11.6
May 2	3.24	468			

Daily discharge, in second-feet, of Bruneau River near Grandview, Idaho, for the year ending Sept. 30, 1915.

Day.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.
1	42	115	131	12	147	238	406	532	1,210	270	5	12
2	63	115	115	12	147	285	406	532	1,210	183	5	12
3	63	115	101	25	147	238	348	435	1,210	183	5	12
4	75	115	147	42	183	238	406	435	1,030	183	5	12
5	75	115	147	42	183	195	406	376	863	147	5	12
6	75	115	147	42	183	195	406	376	784	147	5	12
7	87	115	147	25	147	158	348	376	784	147	5	12
8	87	115	147	25	147	195	348	321	784	183	5	12
9	87	115	115	42	115	158	348	270	708	147	12	12
10	87	115	115	42	115	158	348	321	708	147	12	12
11	87	115	147	87	115	158	285	321	708	115	12	12
12	87	115	131	87	115	158	285	321	708	87	12	25
13	87	115	147	115	115	158	285	435	635	87	12	25
14	87	115	115	115	158	158	285	435	565	87	12	25
15	87	115	87	115	158	195	348	435	565	63	12	25
16	87	115	25	115	158	195	348	435	498	63	12	25
17	183	115	25	115	158	195	348	565	435	42	12	25
18	183	115	42	87	158	238	406	784	435	42	12	25
19	183	115	42	87	195	238	532	784	376	42	12	25
20	147	115	63	87	195	238	348	945	708	42	12	25
21	147	101	63	87	195	238	348	1,030	635	42	12	25
22	147	101	63	115	195	285	406	1,210	635	25	12	25
23	165	115	63	115	195	348	466	1,120	635	25	12	25
24	165	147	63	115	195	348	466	1,030	565	25	12	25
25	165	147	63	115	195	348	466	863	565	12	12	25
26	147	147	63	115	238	348	466	863	435	12	12	25
27	131	147	63	115	238	348	466	784	435	12	12	25
28	131	147	42	147	238	348	406	863	435	12	12	25
29	131	147	42	147	......	406	406	945	376	12	12	25
30	115	147	......	147	......	532	406	945	321	12	12	25
31	115	......	......	147	......	466	......	1,030	......	5	12	......

Monthly discharge of Bruneau River near Grandview, Idaho, for the year ending Sept. 30, 1915.

Month.	Discharge in second-feet.			Run-off (total in acre-feet).	Accuracy.
	Maximum.	Minimum.	Mean.		
October	183	42	113	6,950	B.
November	147	101	122	7,260	C.
December	147	25	87.8	5,400	C.
January	147	12	86.6	5,320	B.
February	238	115	169	9,390	B.
March	532	158	258	15,900	A.
April	532	285	385	22,900	A.
May	1,210	270	649	39,900	A.
June	1,210	321	665	39,600	A.
July	270	5	83.9	5,160	B.
August	12	5	10.2	627	C.
September	25	12	20.2	1,200	B.
The year	1,210	5	220	160,000	

NOTE.—Discharge Dec. 30 and 31 estimated at 30 second-feet on account of doubtful gage heights.

MARYS CREEK NEAR OWYHEE, NEV.

LOCATION.—In the SE. ¼ sec. 19, T. 15 S., R. 4 E. in Idaho, about a mile below the dam site of the Three Creek reservoir project of the United States Indian Service, 7 miles north of the Idaho-Nevada line and about 12 miles north of Owyhee, Nev.

DRAINAGE AREA.—27 square miles at the Three Creek reservoir dam site (measured by United States Indian Service).

RECORDS AVAILABLE.—December 11, 1913, to September 30, 1915.

GAGE.—Stevens water-stage recorder on right bank.

DISCHARGE MEASUREMENTS.—Made from footbridge at gage or by wading.

CHANNEL AND CONTROL.—One channel at all stages but left bank is overflowed in high water. Stream bed of boulders and silt; slightly shifting.

EXTREMES OF DISCHARGE.—Maximum stage recorded during year, 3.66 feet at 5 a. m. May 19 (discharge, 120 second-feet); minimum stage recorded, 1.73 feet August 29 (discharge, 1.3 second-feet).

1913–1915: Maximum stage recorded, 3.98 feet April 5, 1914 (discharge, 160 second-feet); minimum stage August 29, 1915.

WINTER FLOW.—Stage-discharge relation affected by ice. Recording gage not in operation during winter of 1914–1915.

DIVERSIONS.—No diversions above the station.

REGULATION.—None.

ACCURACY.—Stage-discharge relation changed during the winter of 1914–15. Rating curve for period October 1 to November 5 well defined below 5 second-feet; that for period March 22 to September 30 fairly well defined above 5 second-feet. Daily discharge ascertained by applying daily gage heights to rating table. Records fair.

The following discharge measurement was made by E. A. Porter:

July 31, 1915: Gage height, 1.93 feet; discharge, 3.0 second-feet.

Daily discharge, in second-feet, of Marys Creek near Owyhee, Nev., for the year ending Sept. 30, 1915.

Day.	Oct.	Nov.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.
1	4.2	3.8	....	63	32	39	5.2	3.5	....
2	4.5	3.8	....	78	38	27	5.1	3.3	....
3	6.1	4.0	....	62	40	23	5.2	3.0	....
4	6.8	4.2	....	50	39	20	5.4	2.9	....
5	7.3	3.2	....	50	31	18	5.6	2.9	....
6	7.3	....	....	46	27	16	6.4	2.9	....
7	7.3	....	....	42	25	14	9.1	2.9	....
8	7.6	....	....	36	24	13	8.1	2.9	....
9	9.7	....	....	34	22	11	7.8	3.0	....
10	8.8	....	....	33	24	10	7.3	3.0	....
11	8.5	....	....	34	24	11	7.1	3.0	....
12	7.6	....	....	34	28	18	6.8	3.1	....
13	7.0	....	....	42	36	20	6.8	3.1	....
14	6.8	....	....	41	32	16	6.6	3.2	....
15	6.6	....	....	35	27	12	6.4	3.3	....
16	6.3	....	....	30	24	9.7	6.1	3.2	....
17	6.3	....	....	....	36	8.4	5.6	3.1	....
18	10	....	....	....	83	....	5.6	3.1	....
19	9.7	....	....	....	101	....	5.6	2.9	....
20	9.1	....	....	....	56	....	5.2	3.0	....
21	10	....	....	....	48	....	4.7	3.0	....
22	11	....	9.4	....	41	....	4.7	3.0	....
23	9.4	....	15	....	34	....	4.9	3.2	....
24	7.6	....	22	....	35	....	4.6	3.2	....
25	5.2	....	24	35	33	....	4.0	3.1	....
26	4.8	....	34	32	30	....	3.6	3.0	....
27	4.8	....	44	29	28	....	3.5	2.6	....
28	4.5	....	65	27	26	6.4	3.1	2.3	....
29	4.0	....	77	27	29	5.9	2.9	1.7	1.7
30	4.0	....	51	29	25	5.4	2.9	1.9	1.7
31	4.2	....	48	....	24	....	3.2	1.9	....

NOTE.—Stage-discharge relation affected by ice Nov. 6–19; discharge not determined. Water-stage recorder not in operation Nov. 20 to Mar. 21, Apr. 17–24, May 21 and 22, June 18–27, and Sept. 1–28; discharge estimated as follows: Apr. 17–24, 32 second-feet; May 21, 48 second-feet; May 22, 41 second-feet; June 18–27, 7.4 second-feet; Sept. 1–28, 1.8 second-feet.

Monthly discharge of Marys Creek near Owyhee, Nev., for the year ending Sept. 30, 1915.

Month.	Discharge in second-feet.			Run-off (total in acre-feet).
	Maximum.	Minimum.	Mean.	
October	11	4.0	7.00	430
November 1–5	4.2	3.2	3.80	37.7
March 22–31	77	9.4	38.9	772
April	78	27	38.2	2,270
May	101	22	35.5	2,180
June	39	5.4	12.6	750
July	9.1	2.9	5.45	335
August	3.5	1.7	2.91	179
September	....	....	1.79	106

EAST FORK OF BRUNEAU RIVER NEAR HOT SPRING, IDAHO.

LOCATION.—On unsurveyed land in Owyhee County, at the ranch known as Winter Camp, 22 miles southeast of Hot Spring post office.

DRAINAGE AREA.—Not measured.

RECORDS AVAILABLE.—August 13, 1910, to April 3, 1915, when station was discontinued.

GAGE.—Vertical staff on left bank half a mile below house at Winter Camp ranch; read by J. M. Campbell, who is employed on the ranch.

DISCHARGE MEASUREMENTS.—Made by wading or from suspension footbridge 10 feet below gage.

Channel and control.—Bed consists of sand and gravel; clean. Control shifts slightly.

Extremes of discharge.—Maximum stage recorded during the year, 4.7 feet February 20-23 (discharge, 42 second-feet); minimum stage recorded, 3.7 feet on several days in October and November (discharge, 10 second-feet).

1910–1915: Maximum stage recorded, 10.65 feet March 8, 1911 (discharge, 450 second-feet); minimum stage recorded, 2.78 feet September 2, 1911; minimum discharge recorded, 0.4 second-feet August 28, 29, and September 13, 1910, corresponding to a gage height of 2.8 feet.

Winter flow.—Stage-discharge relation seriously affected by ice in December and January; flow not determined as no discharge measurements were made. Accuracy of gage heights doubtful during a part of this period and observer's notes in regard to ice poor.

Diversions.—Numerous small ditches divert water from the river and its tributaries above the station, principally in the Three Creek country.

Regulation.—None.

Accuracy.—Permanence of stage-discharge relation not verified by discharge measurements. Rating curve fairly well defined, applicable prior to October 14, used for open-water periods October to April. Gage read to tenths once daily. Daily discharge ascertained by applying gage heights to rating table. Records poor.

No discharge measurements were made during the year.

Daily discharge, in second-feet, of East Fork of Bruneau River near Hot Spring, Idaho, for the year ending Sept. 30, 1915.

Day.	Oct.	Nov.	Feb.	Mar.	Apr.	Day.	Oct.	Nov.	Feb.	Mar.	Apr.
1	10	12	17	20	23	16	10	10	30	30	....
2	12	12	17	20	23	17	12	12	38	30	....
3	10	12	17	20	23	18	12	12	38	17	....
4	10	10	17	20	....	19	12	12	38	17	....
5	12	10	17	20	....	20	12	....	42	17	....
6	15	10	17	20	....	21	15	....	42	17	....
7	12	10	30	23	....	22	15	....	42	17	....
8	10	10	30	23	....	23	15	....	42	17	....
9	10	10	30	23	....	24	15	....	38	15	....
10	17	10	30	23	....	25	15	17	38	12	....
11	17	10	30	30	....	26	15	17	26	15	....
12	12	10	30	30	....	27	15	20	20	15	....
13	12	10	30	30	....	28	15	20	20	17	....
14	12	10	30	30	....	29	15	23	....	17	....
15	12	10	30	30	....	30	12	17	....	17	....
						31	12	....	....	17	....

Note.—Discharge Nov. 20-24 estimated at 13 second-feet. Discharge Dec. 1 to Jan. 31 not estimated on account of unreliable gage heights and unknown effect of ice.

Monthly discharge of East Fork of Bruneau River near Hot Spring, Idaho, for the year ending Sept. 30, 1915.

Month.	Discharge in second-feet.			Run-off (total in acre-feet).	Accuracy.
	Maximum.	Minimum.	Mean.		
October	17	10	12.9	793	C.
November	23	10	12.7	756	D.
February	42	17	29.5	1,640	D.
March	30	12	20.9	1,290	C.

Note.—See footnote to table of daily discharge.

GRANDVIEW CANAL NEAR GRANDVIEW, IDAHO.

Location.—In sec. 35, T. 5 S., R. 4 E., at the wagon road which crosses the canal 1¾ miles below the heading at the Grandview dam across Bruneau River and about 10 miles southeast of Grandview, Owyhee County.

Records available.—April 11, 1912, to August 20, 1915, when station was discontinued.

Gage.—Vertical staff attached to downstream side of wagon bridge, near right bank; read by S. A. Mullenix, of the Grandview Canal Co.

Discharge measurements.—Made from bridge or by wading.

Channel and control.—Channel above and below gage consists of dirt section; control indefinite. Stage-discharge relation seriously affected by heavy growth of aquatic plants during the summer months and is often affected by the removal of material from channel below gage; canal is usually cleaned in the spring.

Extremes of discharge.—Maximum discharge recorded during year, 128 second-feet May 1 and June 20; canal reported dry March 15–21 and May 24.

1912–1915: Maximum discharge recorded, 161 second-feet May 24, 1914; canal reported dry at various times during each year in which records have been kept.

Winter flow.—Stage-discharge relation not seriously affected by ice; open-channel rating curve assumed applicable.

Diversions.—Two small ditches divert water for use on ranches above the gage.

Regulation.—Discharge controlled by gates at head of canal.

Accuracy.—Stage-discharge relation not permanent; affected by growth of aquatic plants and shifting control. Two poorly defined rating curves used, one applicable October 1 to March 14, the other April 1 to May 23. Gage read to tenths once daily. Daily discharge ascertained by applying gage heights to rating table; shifting-control method used May 25 to August 20. Records poor.

Grandview canal, the largest diversion from Bruneau River, furnishes water for irrigation to a tract of some 4,000 acres in northern Owyhee County. No water is returned to Bruneau River.

Discharge measurements of Grandview canal near Grandview, Idaho, during the year ending Sept. 30, 1915.

[Made by A. W. Harrington.]

Date.	Gage height.	Discharge.
	Feet.	*Sec.-ft.*
May 2	4.82	111
Aug. 19	4.37	39.6

Daily discharge, in second-feet, of Grandview canal near Grandview, Idaho, for the year ending Sept. 30, 1915.

Day.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.
1	57	62	18	18	18	18	18	128	62	115	63
2	62	52	18	18	18	18	18	110	61	120	62
3	62	52	18	18	18	18	18	110	60	113	57
4	72	52	18	18	18	18	18	110	60	113	56
5	62	52	18	18	18	18	18	116	60	118	56
6	62	52	18	18	18	18	26	116	64	117	55
7	66	44	18	18	18	18	43	122	64	116	55
8	66	44	18	18	18	18	43	122	68	116	50
9	66	29	18	18	18	18	43	116	77	115	30
10	66	29	18	18	18	18	61	122	76	121	30
11	62	29	18	18	18	18	66	122	76	114	36
12	62	29	18	18	18	18	86	122	76	113	36
13	62	29	18	18	18	18	110	122	121	113	37
14	62	29	18	18	18	18	104	26	120	112	37
15	62	21	18	18	18	0	122	20	119	117	38
16	62	21	18	18	18	0	122	20	119	116	38
17	62	21	18	18	18	0	122	20	118	116	39
18	62	21	18	18	18	0	122	20	123	103	39
19	72	21	18	18	18	0	122	20	122	103	40
20	72	21	18	18	18	0	116	43	128	102	40
21	72	21	18	18	18	0	110	43	127	95	....
22	72	21	18	18	18	0	116	43	127	95	....
23	72	18	18	18	18	0	116	43	126	94	....
24	72	18	18	18	18	0	116	0	125	87	....
25	66	18	18	18	18	0	116	51	125	82	....
26	62	18	18	18	18	0	122	55	124	81	....
27	62	18	18	18	18	0	122	55	123	80	....
28	62	18	18	18	18	0	122	54	116	80	....
29	62	18	18	18	....	0	122	64	116	74	....
30	62	18	18	18	....	0	122	63	115	74	....
31	62	....	18	18	....	0	....	62	....	68	....

Monthly discharge of Grandview canal near Grandview, Idaho, for the year ending Sept. 30, 1915.

Month.	Discharge in second-feet.			Run-off (total in acre-feet).	Accuracy.
	Maximum.	Minimum.	Mean.		
October	72	57	64.7	3,980	B.
November	62	18	29.9	1,780	C.
December	18	18	18.0	1,110	D.
January	18	18	18.0	1,110	D.
February	18	18	18.0	1,000	D.
March	18	0	8.13	500	D.
April	122	18	86.1	5,120	D.
May	128	0	72.3	4,450	D.
June	128	60	99.9	5,940	D.
July	121	68	103	6,330	D.
August 1-20	68	36	44.7	1,770	D.
The period	....	....	....	33,100	

NOTE.—Water out of canal Mar. 15-31, and May 24.

OWYHEE RIVER NEAR OWYHEE, NEV.

LOCATION.—In sec. 21, T. 46 N., R. 53 E., 40 feet above mouth of Jones Brook, half a mile above the J. P. Jones ranch, 8 miles southeast of Owyhee, and 14 miles above the Nevada-Idaho State line; 5,550 feet above sea level.

DRAINAGE AREA.—380 square miles (measured on Forest Service maps).

RECORDS AVAILABLE.—November 29, 1913, to September 30, 1915.

GAGE.—Stevens water-stage recorder on right bank.

Discharge measurements.—Made by wading or from cable 125 feet above gage.

Channel and control.—Bed consists of ledge rock and boulders filled in with sand and gravel; should be fairly permanent. One channel at all stages. Banks covered with brush; both subject to overflow. At low stages there is a riffle between the gage and Jones Brook but at high stages the rapids below the brook may become the control.

Extremes of discharge.—Maximum stage recorded during year, 4.77 feet at 11 p. m. April 16 (discharge, 432 second-feet); minimum stage, 1.35 feet at 11 p. m. August 23 (discharge, 7.5 second-feet).

1913–1915: Maximum stage recorded, 9.36 feet April 15, 1914 (discharge, 1,360 second-feet); minimum stage recorded August 23, 1915.

Winter flow.—Discharge relation is affected by ice. No records obtained during the winter of 1914–15.

Diversions.—No important diversions above gage.

Regulation.—None.

Accuracy.—Stage-discharge relation practically permanent. Rating curve well defined. Mean daily gage heights obtained by inspecting recorder graph. Daily discharge ascertained by applying mean gage heights to rating table. Records good.

The following discharge measurement was made by E. A. Porter:

July 31, 1915: Gage height, 1.58 feet; discharge, 9.7 second-feet.

Daily discharge, in second-feet, of Owyhee River near Owyhee, Nev., for the year ending Sept. 30, 1915.

Day.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.
1	....	231	231	239	26	11	8.4
2	....	282	231	248	22	11	8.6
3	....	282	215	215	22	11	8.6
4	....	248	207	193	22	11	8.4
5	....	231	189	177	24	10	8.3
6	....	223	173	159	25	11	8.1
7	....	248	159	148	31	10	8.0
8	....	264	151	137	26	10	8.1
9	....	248	143	128	22	10	8.2
10	....	239	141	118	20	9.8	8.2
11	....	248	143	118	19	9.5	8.4
12	....	248	191	149	18	9.3	8.2
13	....	239	215	164	17	9.1	8.3
14	....	239	204	140	16	8.8	8.4
15	....	256	183	114	16	8.5	8.5
16	....	360	162	98	15	8.5	8.5
17	64	388	199	86	14	8.4	8.8
18	....	324	256	75	14	8.4	8.8
19	....	290	378	65	13	8.4	8.8
20	52	273	378	59	12	8.0	8.8
21	....	248	342	46	12	7.9	8.8
22	....	245	369	43	12	7.9	8.6
23	....	243	342	39	12	7.7	8.5
24	....	240	333	36	11	7.7	9.2
25	....	238	342	35	11	7.9	9.7
26	....	236	298	36	11	7.9	13
27	....	233	273	34	10	7.9	13
28	....	231	264	32	9.8	7.9	12
29	324	231	256	30	9.6	7.9	12
30	....	231	231	28	9.5	7.8	12
31	....	....	223	....	9.8	7.9	....

Note.—No record obtained Oct. 1 to Mar. 16.

Monthly discharge of Owyhee River near Owyhee, Nev., for the year ending Sept. 30, 1915.

Month.	Discharge in second-feet.			Run-off (total in acre-feet).	Accuracy.
	Maximum.	Minimum.	Mean.		
April	388	223	258	15,400	B.
May	378	141	239	14,700	B.
June	248	28	106	6,310	B.
July	31	9.5	16.5	1,010	A.
August	11	7.7	8.97	552	A.
September	13	8.0	9.17	546	A.
The period				38,500	

OWYHEE RIVER NEAR OWYHEE, OREG.

Location.—In sec. 2, T. 21 S., R. 46 E., at the county bridge 1½ miles southwest of Owyhee, Malheur County, 3 miles above mouth of river and 10 miles southwest of Nyssa.

Drainage area.—About 11,100 square miles. Watershed not well defined on available maps.

Records available.—March 26, 1890, to October 3, 1896; August 27, 1903, to September 30, 1915.

Gage.—Chain gage on upstream side of highway bridge; read by Mrs. S. J. Watson.

Discharge measurements.—Made from the bridge or by wading.

Channel and control.—Bed consists of gravel and small rock; may shift during high stages. Stage of zero flow determined September 4, 1915, as 1.85 feet.

Extremes of discharge.—Maximum stage recorded during year, 6.5 feet March 31 (discharge 4,420 second-feet); minimum stage recorded, 2.05 feet September 4–5 (discharge, 6 second-feet).

1890–1896 and 1903–1915: Maximum stage recorded, 12.9 feet March 2, 1910 (discharge, 23,200 second-feet); minimum stage recorded, 2.00 feet September 13–27, 1914 (discharge, 1 second-foot).

Winter flow.—Stage-discharge relation often seriously affected by ice; flow estimated from discharge measurments, observer's notes, and weather records.

Diversions.—The Owyhee canal, the principal diversion above the station, heads about 6 miles above the gage. This canal diverts practically all of the natural low-water flow of Owyhee River; maximum diversion about 250 second-feet.

Regulation.—Variation in the flow at the station may be caused by manipulation of the gates at the head of Owyhee canal.

Accuracy.—Stage-discharge relation not permanent; affected by ice December 12 to February 10. Rating curve poorly defined used October 1 to December 11; curve fairly well defined used February 11 to September 30. Gage read to quarter-tenths once daily. Gage height record doubtful at times. Daily discharge ascertained by applying gage heights to rating table. Records fair.

Discharge measurements of Owyhee River near Owyhee, Oreg., during the year ending Sept. 30, 1915.

Date.	Made by—	Gage height.	Discharge.	Date.	Made by—	Gage height.	Discharge.
		Feet.	*Sec.-ft.*			*Feet.*	*Sec.-ft.*
Dec. 16	A. W. Harrington	a 3.22	178	Apr. 26	A. W. Harrington	3.48	584
Jan. 30	.....do	a 3.80	231	July 14	.....do	2.22	33.3
Mar. 16	L. W. Roush	3.09	335	Sept. 4	.....do	2.00	5.58

a Stage-discharge relation affected by ice.

Daily discharge, in second-feet, of Owyhee River near Owyhee, Oreg., for the year ending Sept. 30, 1915.

Day.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.
1	11	61	118	......	......	528	3,160	636	1,040	35	23	10
2	23	73	118	......	......	528	2,270	599	952	29	23	10
3	23	61	118	......	......	599	2,020	599	870	23	23	10
4	23	61	118	......	......	528	2,020	636	870	23	23	6
5	23	61	118	......	......	528	1,900	673	829	23	23	6
6	23	61	154	......	......	599	1,560	750	712	23	23	10
7	23	61	173	......	......	599	1,360	750	712	82	23	10
8	23	61	216	......	......	461	1,310	750	636	11	23	10
9	23	61	239	......	......	461	1,260	673	564	23	22	10
10	23	61	178	......	......	430	1,080	599	494	313	23	10
11	30	61	118	......	369	398	993	528	430	313	22	10
12	30	61	......	......	528	340	870	461	369	40	10	10
13	30	61	......	......	494	286	910	461	313	40	10	10
14	30	61	......	......	461	286	870	398	271	23	10	11
15	40	61	......	......	461	286	829	461	247	23	10	12
16	40	61	178	......	398	340	750	553	223	23	10	13
17	40	61	......	......	286	430	750	645	201	23	10	14
18	40	61	......	......	286	673	750	737	201	23	10	15
19	61	73	......	......	313	1,080	750	829	271	23	10	15
20	61	87	......	......	313	1,080	750	1,120	180	23	10	15
21	61	87	......	......	340	1,260	673	1,040	180	23	10	15
22	61	194	......	......	340	1,220	599	1,410	180	16	10	15
23	61	173	......	......	398	1,170	599	1,780	180	16	10	15
24	61	194	......	......	461	1,260	564	1,670	143	16	10	22
25	61	194	......	......	461	1,410	564	1,560	112	11	10	29
26	61	154	......	......	461	3,000	599	1,560	82	11	10	29
27	61	154	......	......	461	3,000	673	1,410	71	11	10	29
28	61	154	......	......	494	2,270	673	1,310	60	11	10	29
29	61	118	......	......	......	2,720	673	1,310	50	14	10	29
30	61	118	......	231	......	3,160	673	1,220	40	17	10	29
31	61	......	......	240	......	4,420	......	1,120	......	20	10	......

NOTE.—Discharge estimated, because of ice, from discharge measurements, observer's notes, and weather records, as follows: Dec. 12-15, 130 second-feet; 17-31, 140 second-feet; Jan. 1-29, 180 second-feet Jan. 30, 240 second-feet; Feb. 1-10, 300 second-feet; interpolated Sept. 13-17.

Monthly discharge of Owyhee River near Owyhee, Oreg., for the year ending Sept. 30, 1915.

Month.	Discharge in second-feet.			Run-off (total in acre-feet).	Accuracy.
	Maximum.	Minimum.	Mean.		
October	61	11	41.6	2,560	C.
November	194	61	93.7	5,580	C.
December	....	....	144	8,850	D.
January	....	....	184	11,300	D.
February	528	....	369	20,500	C.
March	4,420	286	1,140	70,100	B.
April	3,160	564	1,080	64,300	B.
May	1,780	398	911	56,000	B.
June	1,040	40	383	22,800	B.
July	313	11	42.1	2,590	C.
August	23	10	14.6	898	D.
September	29	6	15.3	910	D.
The year	4,420	6	368	266,000	

NOTE.—See footnote to daily-discharge table.

JACK CREEK NEAR TUSCARORA, NEV.

Location.—In sec. 35, T. 42 N., R. 52 E., at R. M. Woodward's ranch on the Elko-Mountain City stage road, 8 miles above confluence with South Fork of Owyhee River and 12 miles northeast of Tuscarora, Elko County.

Drainage area.—31 square miles (measured on Forest Service maps).

Records available.—May 15, 1913, to September 30, 1915.

Gage.—Vertical staff on left bank 500 feet below Woodward's house; read by R. M. Woodward. Datum raised 1.50 feet September 1, 1914.

Channel and control.—Bed consists of coarse gravel and small boulders; practically permanent; slope steep. Banks low and lined with willows; may be overflowed to some extent during high water.

Extremes of discharge.—Maximum stage recorded during year, 1.95 feet May 24 to 26 (determined from water marks; no gage-height record; discharge, 168 second-feet); minimum stage recorded, 0.3 foot February 14 and August 18–26 (discharge, 1.5 second-feet). Flow was probably as low as 1 second-foot for a few days in December and January and possibly between August 27 and 31.

1913–1915: Maximum stage recorded, 2.17 feet (present datum) April 10, 1914 (discharge, 244 second-feet). Minimum occurred in 1915.

Winter flow.—Stream freezes over; stage-discharge relation affected by ice. During the early spring there is considerable diurnal fluctuation. Determinations of discharge based on observer's notes, weather records and observations made during short periods in which there was practically no effect from ice.

Diversions.—No important diversions above gage.

Regulations.—None.

Accuracy.—Stage-discharge relation practically permanent; affected by ice November 15 to February 1. Rating curve well defined. Gage read to half tenths once or twice daily before September 3 and to hundredths after that date. Daily discharge ascertained by applying mean daily gage heights to rating table. See footnote to table of daily discharge. Open-water records good; others fair.

Discharge measurements of Jack Creek near Tuscarora, Nev., during the year ending Sept. 30, 1915.

[Made by A. B. Purton.]

Date.	Gage height.	Discharge.	Date.	Gage height.	Discharge.
	Feet.	*Sec.-ft.*		*Feet.*	*Sec.-ft.*
May 27	1.62	109	Sept. 3	0.33	1.9
27	1.62	107			

Daily discharge, in second-feet, of Jack Creek near Tuscarora, Nev., for the year ending Sept. 30, 1915.

Day.	Oct.	Nov.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.
1	5	12	3	5	30	104	139	43	5	1.6
2	5	12	3	5	30	121	130	43	5	1.7
3	5	10	3	5	30	88	139	38	5	1.6
4	7	10	3	6	29	73	130	38	5	1.6
5	7	10	5	6	28	60	130	34	5	1.6
6	7	9	5	6	27	54	139	34	5	1.8
7	12	9	5	6	26	48	139	29	4	2.0
8	12	8	5	6	26	43	130	29	4	2.0
9	12	8	5	6	26	38	121	26	4	2.0
10	12	7	5	6	29	43	121	26	3	2.1
11	12	8	5	6	26	48	112	22	3	2.0
12	12	5	5	6	29	54	88	22	3	2.0
13	10	5	3	7	34	73	73	19	2	2.2
14	10	5	1.5	8	38	73	66	16	2	2.2
15	8	....	3	8	34	80	66	14	2	2.2
16	8	....	3	8	46	88	66	12	2	2.0
17	8	....	3	10	43	121	66	12	2	2.3
18	8	....	3	12	54	112	66	12	1.5	2.3
19	8	....	3	12	60	130	66	10	1.5	2.3
20	8	....	3	12	73	139	66	10	1.5	2.2
21	12	....	3	16	88	148	60	10	1.5	2.3
22	14	....	3	20	96	130	60	8	1.5	2.3
23	14	....	3	26	88	121	54	8	1.5	2.3
24	12	....	3	30	88	....	54	8	1.5	3.0
25	12	....	3	28	73	....	54	8	1.5	3.7
26	12	....	5	26	88	....	54	7	1.5	4.3
27	12	....	5	26	88	104	48	7	....	4.3
28	12	....	5	26	88	121	48	7	....	4.3
29	12	....	....	26	88	130	48	5	....	4.5
30	12	....	....	26	73	139	43	5	....	4.6
31	12	....	....	30	....	139	....	5	....	....

NOTE.—Discharge Mar. 4 to Apr. 6 estimated on account of diurnal fluctuation from a study of morning and evening gage readings. Discharge estimated, on account of ice, as follows: Nov. 15–30, 5 second-feet; Dec. 1–20, 4 second-feet; Dec. 21 to Jan. 31, 2 second-feet; and Feb. 1, 3 second-feet. Discharge estimated for lack of gage readings as follows: May 24–26, 140 second-feet; Aug. 27–31, 1.5 second-feet. Discharge interpolated Sept. 1, 2, 24, 25, and 30.

Monthly discharge of Jack Creek near Tuscarora, Nev., for the year ending Sept. 30, 1915.

Month.	Discharge in second-feet.			Run-off (total in acre-feet).	Accuracy.
	Maximum.	Minimum.	Mean.		
October	14	5	10.1	621	C.
November	12	....	6.60	393	D.
December	....	....	3.29	202	D.
January	....	....	2.00	123	D.
February	5	1.5	3.73	207	C.
March	30	5	13.7	842	C.
April	96	26	52.5	3,120	B.
May	....	38	98.1	6,030	B.
June	139	43	85.9	5,110	B.
July	43	5	18.3	1,130	B.
August	5	....	2.65	163	C.
September	4.6	1.6	2.51	149	C.
The year	....	....	25.0	18,100	

NOTE.—See footnote to daily-discharge table.

JORDAN CREEK NEAR JORDAN VALLEY, OREG.

LOCATION.—In sec. 9, T. 30 S., R. 45 E., in canyon at lower end of Jordan Valley, 9 miles below Jordan Valley post office, Malheur County. Cow Creek enters Jordan Creek 7 miles below station.

DRAINAGE AREA.—Not measured.

RECORDS AVAILABLE.—April 28, 1911, to September 30, 1915.

Gage.—Inclined staff on right bank, one-eighth mile below upper end of the canyon; read by Marcos Renteria.

Discharge measurements.—Made by wading or from cable near gage.

Channel and control.—One channel. Control consists of lava rock; probably permanent. During the summer months growth of moss frequently affects the stage-discharge relation to a marked degree.

Extremes of discharge.—Maximum stage recorded during year, 6.6 feet at 9 a. m., May 20 (discharge, 655 second-feet); creek dry at gage August 17 to September 30.

1911–1915: Maximum stage recorded, 9.9 feet April 24, 1912 (discharge, 2,150 second-feet); creek reported dry for periods of several weeks in 1911, 1914, and 1915.

Winter flow.—Stage-discharge relation seriously affected by ice; flow estimated from observer's notes and weather records.

Diversions.—Practically the entire summer flow of the stream is used by the many small diversions in the valley above the gage. Flood water is also diverted into the Antelope reservoir.

Regulation.—None.

Accuracy.—Stage-discharge relation practically permanent; affected by ice November 19–24 and December 1 to February 28, and by growth of moss during the summer. Rating curve well defined. Gage read to hundredths once daily. Daily discharge ascertained by applying daily gage heights to rating table. Records good except for periods during which stage-discharge relation was affected by ice or moss.

The following discharge measurements was made by G. C. Baldwin:

June 28, 1915: Gage height, 3.05 feet; discharge, 8.6 second-feet.

Daily discharge, in second-feet, of Jordan Creek near Jordan Valley, Oreg., for the year ending Sept. 30, 1915.

Day.	Oct.	Nov.	Mar.	Apr.	May.	June.	July.	Aug.
1		4.7	39	293	184	202	9.4	0.6
2		5.6	37	271	193	202	7.5	.6
3		6.4	36	318	176	193	5.6	.5
4		5.0	36	364	160	168	3.9	.5
5		5.6	37	340	152	146	4.2	.5
6		5.6	31	316	145	124	4.5	.4
7		6.4	31	304	124	112	15	.4
8		6.4	34	316	99	93	29	.4
9		6.9	36	293	88	80	23	.4
10		7.5	37	260	112	68	19	.3
11		6.9	39	260	131	56	22	.2
12		7.2	41	250	193	53	22	.1
13		7.5	45	271	220	61	19	.1
14	0.9	7.3	47	264	293	61	16	.1
15	1.7	7.1	59	257	415	60	11	
16	2.0	6.9	71	250	389	47	9.0	
17	1.7	6.4	82	220	340	44	6.9	
18	1.7	5.6	93	211	389	41	5.8	
19	2.5		112	220	499	31	4.5	
20	2.5		105	220	655	24	3.5	
21	2.5		112	211	590	20	3.0	
22	2.5		132	211	499	18	2.3	
23	2.3		152	202	499	15	1.7	
24	2.5		193	193	457	13	1.3	
25	3.2	9.4	212	168	415	11	.9	
26	3.9	10	230	153	364	10	.8	
27	3.9	9.4	211	138	307	10	.7	
28	3.9	8.4	211	131	250	8.4	.6	
29	3.4	7.5	240	142	260	8.4	.6	
30	4.5	7.5	304	152	260	9.4	.6	
31	5.6		304		231		.6	

Note.—Shifting-control method used June 12–24 and July 18 to Aug. 16, during period of moss effect. Discharge estimated because of ice from weather records and observer's notes as follows: Nov. 19–24, 7.5 second-feet; Dec. 1–31, 10 second-feet; Jan. 1–31, 15 second-feet; Feb. 1–28, 30 second-feet. Discharge interpolated for various days for which gage heights are not available. No flow Oct. 1–13 and Aug. 15 to Sept. 30.

Monthly discharge of Jordan Creek near Jordan Valley, Oreg., for the year ending Sept. 30, 1916.

Month.	Discharge in second-feet.			Run-off (total in acre-feet).	Accuracy.
	Maximum.	Minimum.	Mean.		
October	5.6	0.0	1.65	101	C.
November	10	4.7	7.07	421	C.
December			10.0	615	D.
January			15.0	922	D.
February			30.0	1,670	D.
March	304	31	108	6,640	A.
April	364	131	240	14,300	A.
May	655	88	293	18,000	A.
June	202	8.4	66.3	3,950	B.
July	29	.6	8.19	504	C.
August	.6	.0	.16	9.8	
September	.0	.0	.00	.0	
The year	655	.0	65.1	47,100	

NOTE.—See footnote to table of daily discharge.

OWYHEE CANAL NEAR OWYHEE, OREG.

LOCATION.—In sec. 6, T. 21 S., R. 46 E., at the bridge which crosses the canal at the Wilson ranch, 2¼ miles below head of canal, 5 miles southwest of Owyhee, Malheur County, and 15 miles southwest of Nyssa.

RECORDS AVAILABLE.—May to October, 1904; May to September, 1905; October 5, 1911, to September 30, 1915.

GAGE.—Inclined staff on right bank at upstream side of bridge; read during the irrigation season by the ditch rider. Gage used during 1904 and 1905, was one-fourth mile upstream from site of present gage.

DISCHARGE MEASUREMENTS.—Made from the bridge or by wading.

CHANNEL AND CONTROL.—Bed of canal is clean and smooth. Control not well defined but fairly permanent.

EXTREMES OF DISCHARGE.—1904–1905 and 1911–1915: Maximum stage recorded, 5.2 feet May 18 and 23, 1915 (discharge 240 second-feet); no flow June 18–19, June 24, and July 10–11, 1915, and at various times in 1912, 1913, 1914, and 1915.

WINTER FLOW.—Canal freezes. Winter gage readings not available; flow estimated from discharge measurements and observer's notes.

DIVERSIONS.—Surplus water is returned to the Owyhee River through two wasteways between the gage and the station on the river near Owyhee; one of these wasteways is a quarter of a mile below the gage. Two small ditches with a combined capacity probably not exceeding 3 second-feet divert from the canal above the station.

REGULATION.—Abrupt changes of stage due to manipulation of head gates not to be expected, as water is kept at nearly constant stage.

ACCURACY.—Stage-discharge relation not changed during the year; affected by ice during the winter. Rating curve well defined. Gage read to tenths once daily. Daily discharge ascertained by applying daily gage heights to rating table. Records good during irrigation season but poor for winter.

The Owyhee canal diverts water from Owyhee River in sec. 18, T. 21 S., R. 46 E., and in 1915 supplied water for irrigation to about 9,000 acres of land in the vicinity of Owyhee, Nyssa, and Ontario. During the winter the flow past the gage is derived from snow and from leakage through the head gates and is returned to the river through the wasteway a quarter of a mile below the station.

Discharge measurements of Owyhee canal near Owyhee, Oreg., during the year ending Sept. 30, 1915.

Date.	Made by—	Gage height.	Discharge.	Date.	Made by—	Gage height.	Discharge.
		Feet.	*Sec-ft.*			*Feet.*	*Sec.-ft.*
Dec. 16	A. W. Harrington	[a] 1.68	4.9	Apr. 26	A. W. Harrington	5.02	221
Jan. 30	do	[a] 2.36	1.7	July 14	do	4.85	211
Mar. 15	L. W. Roush	3.93	133	Sept. 4	do	3.66	108

[a] Stage-discharge relation affected by ice.

Daily discharge, in second-feet, of Owyhee canal near Owyhee, Oreg., for the year ending Sept. 30, 1915.

Day.	Oct.	Nov.	Dec.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.
1	144	136	128			222	231	213	195	105
2	144	136	128			222	231	213	152	105
3	144	136	128			222	231	213	152	105
4	136	136	128			231	231	213	152	105
5	136	136	128			231	231	204	152	105
6	136	136				231	231	222	136	105
7	136	136				231	231	204	136	105
8	136	136				231	231	222	136	112
9	136	136				231	231	222	136	120
10	136	136				231	231	0	136	120
11	136	136				222	231	0	136	120
12	136	136		65		222	231	222	120	120
13	136	136		130		222	231	213	120	120
14	136	136		130		222	222	213	120	120
15	136	136		132		222	231	204	120	120
16	136	136				231	231	195	136	136
17	136	136				231	231	195	136	136
18	136	136				240	0	195	136	136
19	136	136				231	0	186	120	136
20	136	136				231	231	186	105	136
21	136	136				231	231	177	120	136
22	136	136				231	222	177	120	136
23	136	128				240	231	168	120	136
24	136	128				231	0	168	105	136
25	136	128				231	222	160	105	136
26	136	128			222	231	222	160	120	136
27	136	128			231	231	222	160	120	136
28	136	128			222	231	222	152	105	136
29	136	128			222	231	222	152	105	136
30	136	128			222	231	213	152	105	136
31	136					222		152	120	

NOTE.—Discharge estimated as follows: Dec. 6-15, 5 second-feet; Dec. 17-31, 4 second-feet; Mar. 1-11, 3 second-feet; Mar. 12, 65 second-feet; Mar. 13-14, 130 second-feet; Mar. 16-31, 140 second-feet; Apr. 1, 25, 180 second-feet.

Monthly discharge of Owyhee canal near Owyhee, Oreg., for the year ending Sept. 30, 1915.

Month.	Discharge in second-feet.			Run-off (total in acre-feet).	Accuracy.
	Maximum.	Minimum.	Mean.		
October	144	136	137	8,420	B.
November	136	128	134	7,970	B.
December	128		24.4	1,500	D.
January			[a] 3.0	184	D.
February			[a] 2.0	111	D.
March			88.1	5,420	D.
April	231		187	11,100	C.
May	240	222	229	14,100	A.
June	231	0	205	12,200	B
July	222	0	178	10,900	B.
August	195	105	128	7,870	B.
September	136	105	124	7,380	C.
The year	240	0	120	87,200	

[a] Estimated.

BOISE RIVER NEAR TWIN SPRINGS, IDAHO.

Location.—On unsurveyed land, approximately in sec. 23, T. 4 N., R. 6 E., a quarter of a mile above Birch Creek, 1½ miles above flow line of the Arrowrook reservoir, 4 miles below Twin Springs, Boise County, and 18 miles above Arrowrock.

Drainage area.—830 square miles (measured on topographic maps).

Records available.—March 22, 1911, to September 30, 1915.

Gage.—Friez water-stage recorder on right bank; installed April 4, 1915. March 22, 1911, to April 1, 1915, inclined staff, and April 2–3, 1915, vertical staff at practically the same site and set to the same datum. Roy Call, observer.

Discharge measurements.—Made from cable about 50 feet above gage.

Channel and control.—Bed composed of gravel and boulders. Banks not subject to overflow. One channel at all stages. Control practically permanent except under conditions of unusual heavy ice or extreme floods.

Extremes of discharge.—Maximum stage recorded during year, 5.8 feet at 4.30 p. m. January 26 (water backed up by ice jam); maximum discharge at gage height, 4.62 at 6 a. m., April 19 (discharge, 3,140 second-feet); minimum discharge not definitely known, but about 188 second-feet, December 17, 22, and 25, and on January 22 and 23 at gage heights varying from 2.0 to 4.4 feet; minimum gage height, 1.9 at 4 p. m., December 8.

1911–1915: Maximum stage recorded during period, 7.4 feet, June 13, 1912 (discharge, 7,900 second-feet); minimum discharge, December 17, 22, and 25, 1914, and January 22 and 23, 1915; minimum gage height recorded December 8, 1914.

Winter flow.—Stage-discharge relation seriously affected by ice; flow estimated from discharge measurements, observer's notes, and weather records.

Diversions.—No important diversions above station and none between it and the station at Dowling.

Regulation.—None.

Accuracy.—Stage-discharge relation changed during the winter of 1914–15. Affected by ice December 9 to February 6, February 8–11 and 16–21. Two well-defined rating curves used, one applicable October 1 to December 8, the other February 7 to September 30. Gage read to hundredths once daily during open-water season and about three times a week during winter. Mean daily gage heights after April 4 obtained by inspecting recorder graph. Daily discharge ascertained by applying daily gage heights to rating tables.

Cooperation.—Occasional discharge measurements made by employees of the United States Reclamation Service.

Discharge measurements of Boise River near Twin Springs, Idaho, during the year ending Sept. 30, 1915.

Date.	Made by—	Gage height.	Discharge.	Date.	Made by—	Gage height.	Discharge.
		Feet.	*Sec.-ft.*			*Feet.*	*Sec.-ft.*
Jan. 12	A. W. Harrington	[a]4.43	364	June 14	A. C. Price	3.29	1,350
Mar. 26	.....do	2.67	768	July 1	.....do	2.96	1,020
29	.....do	2.99	994	15	Harrington and Price	2.65	729
Apr. 4	.....do	3.15	1,180	29	A. C Price	2.26	477
May 5	Steward and Price	3.24	1,240	Aug. 12	.....do	2.13	377
7	.....do	3.13	1,160	21	G. C. Baldwin	2.08	324
26	A. C. Price	3.88	2,120				

[a] Stage-discharge relation affected by ice.

Note.—Steward and Price are employees of the United States Reclamation Service.

Daily discharge, in second-feet, of Boise River near Twin Springs, Idaho, for the year ending Sept. 30, 1915.

Day.	Oct.	Nov.	Dec.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.
1	451	515	362	......	374	779	1,880	2,570	977	518	324
2	483	515	330	......	374	906	1,630	2,500	977	468	475
3	515	515	391	......	374	1,140	1,490	2,140	968	441	374
4	1,120	515	452	......	390	1,160	1,380	1,940	941	427	355
5	802	500	412	......	407	1,090	1,300	1,880	915	414	342
6	484	484	371	......	360	1,100	1,230	1,940	1,020	407	330
7	484	452	330	374	312	1,120	1,180	1,880	1,100	407	324
8	452	452	290	......	336	1,070	1,160	2,010	1,060	400	318
9	452	452	......	......	360	1,060	1,220	2,080	1,050	388	318
10	515	452	......	......	383	1,090	1,500	1,940	1,030	374	312
11	515	452	......	......	407	1,140	1,570	1,810	915	362	312
12	515	452	......	342	418	1,260	1,750	1,630	838	355	324
13	484	452	......	312	430	1,630	2,280	1,470	804	355	355
14	484	452	......	312	441	1,690	2,500	1,340	779	342	342
15	484	396	......	275	467	1,540	2,360	1,280	730	355	330
16	484	340	......	......	493	1,630	2,210	1,330	698	348	330
17	484	354	......	......	520	1,880	2,210	1,370	667	342	324
18	500	367	......	......	546	1,880	2,720	1,400	643	330	312
19	515	340	......	......	571	1,940	3,030	1,400	613	336	312
20	586	362	......	......	595	1,940	2,800	1,350	590	336	299
21	657	385	......	......	620	2,080	2,570	1,310	568	330	299
22	583	407	......	407	745	1,940	2,430	1,310	546	324	299
23	583	430	......	407	871	1,690	2,280	1,320	532	318	299
24	583	452	......	407	996	1,540	2,360	1,330	503	324	299
25	572	423	......	407	863	1,450	2,210	1,380	489	324	293
26	560	394	......	390	779	......	2,080	1,280	482	305	330
27	549	394	......	374	698	......	1,940	1,110	475	287	448
28	538	394	......	374	738	......	2,080	1,000	461	281	381
29	526	394	......	......	996	......	2,210	968	455	281	362
30	515	394	......	......	950	......	2,210	977	448	281	342
31	515	......	......	......	821	......	2,280	......	482	281	......

NOTE.—Discharge estimated, on account of ice, from discharge measurement, weather records, and observer's notes, as follows: Dec. 9–25, 226 second-feet; Dec. 26–31, 302 second-feet; Jan. 1–16, 345 second-feet; Jan. 17–31, 265 second-feet; Feb. 1–6, 407 second-feet; Feb. 8–11, 342 second-feet; Feb. 16–21, 336 second-feet. Discharge Apr. 26–30 estimated at 1,600 second-feet. Discharge interpolated, because of lack of readings on numerous days from Oct. 1 to Dec. 7 and Feb. 23 to Mar. 23.

Monthly discharge of Boise River near Twin Springs, Idaho, for the year ending Sept. 30, 1915.

[Drainage area, 830 square miles.]

Month.	Discharge in second-feet.				Run-off.		Accuracy.
	Maximum.	Minimum.	Mean.	Per square mile.	Depth in inches on drainage area.	Total in acre-feet.	
October	1,120	451	548	0.660	0.76	33,700	B.
November	515	340	430	.518	.58	25,600	B.
December	452	....	277	.334	.39	17,000	C.
January	....	....	306	.369	.43	18,800	C.
February	....	....	365	.440	.46	20,300	C.
March	996	312	569	.686	.79	35,000	B.
April	2,080	779	1,460	1.76	1.96	86,900	A.
May	3,030	1,160	2,000	2.41	2.78	123,000	A.
June	2,570	968	1,570	1.89	2.11	93,400	A.
July	1,100	448	734	.884	1.02	45,100	A.
August	518	281	356	.429	.49	21,900	A.
September	475	293	335	.404	.45	19,900	A.
The year	3,030	....	747	.900	12.22	541,000	

NOTE.—See footnote to table of daily discharge.

BOISE RIVER AT DOWLING'S RANCH, NEAR ARROWROCK, IDAHO.

LOCATION.—In sec. 15, T. 3 N., R. 4 E., at Dowling station on Boise and Arrowrock Railroad, Elmore County, three-fourths mile above Moore Creek, 2 miles below Highland power dam, and 4 miles below Arrowrock.

DRAINAGE AREA.—2,230 square miles (measured on topographic maps).

RECORDS AVAILABLE.—March 13, 1911, to September 30, 1915.

GAGE.—Friez water-stage recorder on left bank; installed March 19, 1915, to replace an inclined staff set to same datum and at practically the same site.

DISCHARGE MEASUREMENTS.—Made from cable 50 feet below gage.

CHANNEL AND CONTROL.—Bed composed of gravel and boulders. One channel at all stages. Control subject to slight changes.

EXTREMES OF DISCHARGE.—Maximum stage recorded during year, 4.85 feet at 8 a. m. April 20 (discharge, 3,340 second-feet); minimum stage recorded, 2.08 feet at 6 p. m. May 13 (discharge, 307 second-feet.)

1911–1915: Maximum stage recorded 8.7 feet June 13, 1911 (discharge, 15,100 second-feet); minimum stage recorded May 13, 1915.

WINTER FLOW.—Stage-discharge relation at times seriously affected by ice; flow estimated from discharge measurements, observer's notes, and weather records.

DIVERSIONS.—No diversions of importance above the station and none between it and next station below.

REGULATION.—On and after February 21, 1915, flow was regulated at Arrowrock dam, 4 miles upstream. Storage capacity of Arrowrock reservoir is about 280,000 acre-feet. Water is stored during the winter and spring and released during the irrigation season.

ACCURACY.—Stage-discharge relation changed slightly during the winter of 1914-15; affected by ice December 14 to February 18. Two well-defined rating curves used, one applicable October 1 to December 13, the other February 19 to September 30. Staff gage read daily throughout the year. Mean daily gage heights after March 19 obtained by inspecting recorder graph. Daily discharge ascertained by applying mean daily gage heights to rating table. Records excellent for open-water season, good for December and February, and fair for January.

COOPERATION.—A large number of current-meter measurements made by employees of the United States Reclamation Service and of the Idaho State engineer have been furnished to the Survey.

Discharge measurements of Boise River at Dowling's ranch, near Arrowrock, Idaho, during the year ending Sept. 30, 1915.

Date.	Made by—	Gage height.	Discharge.	Date.	Made by—	Gage height.	Discharge.
		Feet.	*Sec.-ft.*			*Feet.*	*Sec.-ft.*
Jan. 10	A. W. Harrington	[a] 3.25	720	Aug. 12	E. T. Lakin [c]	3.90	1,810
Feb. 20	A. C. Price [b]	3.18	1,000	16	do	3.85	1,670
24	Purton and Price	[a] 2.51	485	18	do	3.85	1,730
25	do	2.47	491	19	do	3.88	1,750
26	Baldwin and Price [b]	2.27	400	20	G. C. Baldwin	3.88	1,770
27	G. C. Baldwin	2.21	354	21	E. T. Lakin [c]	3.96	1,860
Mar. 21	A. W. Harrington	3.39	1,190	26	do	3.75	1,610
26	Paul [b] and Elford [b]	3.81	1,770	27	do	3.74	1,600
Apr. 7	G. C. Baldwin	3.92	1,830	30	Lakin [c] and McConnel [c]	3.65	1,450
9	Steward [b] and Price [b]	4.22	2,330	31	W. N. McConnel [c]	3.63	1,440
9	Price [b] and Elford [b]	4.14	2,220	Sept. 1	do	3.60	1,410
17	do	4.43	2,520	2	do	3.59	1,400
24	do	4.82	3,290	3	do	3.65	1,500
29	do	4.60	2,780	7	Price [b] and McConnel [c]	3.52	1,340
May 4	Steward [b] and Price [b]	4.16	2,160	8	W. N. McConnel [c]	3.48	1,360
7	A. W. Harrington	4.01	1,960	9	do	3.46	1,320
15	Harrington and Price [b]	2.87	735	10	do	3.36	1,140
25	A. C. Price [b]	3.57	1,400	13	do	3.30	1,130
July 10	E. T. Lakin [c]	4.54	2,830	14	do	3.26	1,090
13	do	4.39	2,690	15	Price [b] and Steward [b]	3.20	1,030
22	do	3.96	1,920	15	W. N. McConnel [c]	3.24	1,060
24	A. C. Price [b]	4.00	1,990	16	do	3.27	1,070
30	E. T. Lakin [c]	3.93	1,830	17	do	3.28	1,120
Aug. 1	do	3.96	1,900	20	do	3.27	1,070
2	do	3.94	1,840	21	do	3.24	1,060
3	do	3.92	1,820	22	do	3.26	1,100
4	do	3.97	1,860	23	do	3.20	1,010
5	do	3.87	1,750	24	do	3.16	978
6	do	3.77	1,630	27	do	3.27	1,100
9	do	3.84	1,730	28	do	3.35	1,190
10	do	3.84	1,730	29	do	3.28	1,110

[a] Stage-discharge relation affected by ice.
[b] Employee of United States Reclamation Service.
[c] Employee of Idaho State engineer.

Daily discharge, in second-feet, of Boise River at Dowling's ranch, near Arrowrock, Idaho, for the year ending Sept. 30, 1915.

Day.	Oct.	Nov.	Dec.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.
1	800	971	722	......	405	1,740	2,160	1,670	2,970	1,870	1,470
2	842	971	761	......	484	1,800	2,080	1,940	2,970	1,870	1,440
3	1,020	971	800	......	570	1,800	2,080	2,080	2,970	1,870	1,470
4	971	927	971	......	890	1,870	2,080	2,230	2,970	1,800	1,450
5	927	927	883	......	810	1,870	2,160	2,380	2,970	1,670	1,350
6	883	883	800	......	772	1,740	2,010	2,710	2,880	1,650	1,320
7	883	883	722	......	736	1,800	1,940	2,880	2,880	1,650	1,350
8	883	842	686	......	700	1,940	2,010	2,880	2,880	1,670	1,340
9	883	842	581	......	700	2,160	2,080	3,060	2,800	1,740	1,290
10	883	883	581	......	810	2,230	1,800	3,060	2,800	1,740	1,220
11	971	883	581	......	849	2,230	1,560	3,060	2,800	1,740	1,170
12	971	883	649	......	849	2,310	1,430	3,060	2,630	1,800	1,160
13	927	927	649	......	890	2,310	765	3,060	2,540	1,800	1,130
14	883	883	......	......	931	2,380	546	2,800	2,540	1,740	1,080
15	842	800	......	......	975	2,460	736	2,630	2,460	1,800	1,060
16	842	800	......	......	1,020	2,460	841	2,880	2,310	1,740	1,070
17	883	761	......	......	1,070	2,630	940	3,060	2,080	1,740	1,090
18	1,160	761	......	......	1,210	2,800	1,030	3,150	1,940	1,740	1,080
19	1,210	649	......	975	1,270	3,060	1,120	3,150	1,940	1,710	1,060
20	1,260	722	......	975	1,210	3,240	1,190	3,240	1,940	1,800	1,070
21	1,260	800	......	772	1,190	3,240	1,240	3,240	1,870	1,800	1,070
22	1,160	800	......	810	1,310	3,240	1,280	3,150	1,870	1,740	1,060
23	1,110	800	......	736	1,490	3,240	1,310	3,150	1,940	1,740	1,050
24	1,060	842	......	511	1,550	3,240	1,340	3,150	1,940	1,740	1,050
25	1,060	842	......	484	1,640	3,240	1,390	3,150	2,010	1,670	1,050
26	1,060	800	......	405	1,670	3,240	1,410	3,240	2,010	1,640	1,010
27	1,060	800	......	358	1,670	3,240	1,440	3,150	1,940	1,590	1,060
28	1,020	800	......	315	1,670	3,060	1,470	3,060	1,870	1,530	1,140
29	971	800	......	......	1,650	2,880	1,490	3,030	1,870	1,530	1,130
30	971	800	......	......	1,590	2,460	1,510	3,060	1,870	1,490	1,080
31	971	......	......	......	1,540	......	1,540	......	1,870	1,480	......

NOTE.—Discharge estimated on account of ice from discharge measurements, weather records, and observer's notes as follows: Dec. 14–23, 495 second-feet; Dec. 21–31, 681 second-feet; Jan. 1–17, 733 second-feet; Jan. 18–31, 615 second-feet; Feb. 1–18, 867 second-feet.

Monthly discharge of Boise River at Dowling's ranch, near Arrowrock, Idaho, for the year ending Sept. 30, 1915.

Month.	Discharge in second-feet.			Run-off (total in acre-feet).	Accuracy.
	Maximum.	Minimum.	Mean.		
October	1,260	800	988	60,800	A.
November	971	649	842	50,100	A.
December	971	....	638	39,200	B.
January	....	....	680	41,800	C.
February	975	315	784	43,500	B.
March	1,670	405	1,100	67,600	A.
April	3,240	1,740	2,530	151,000	A.
May	2,160	546	1,480	91,000	A.
June	3,210	1,670	2,880	171,000	A.
July	2,970	1,978	2,370	146,000	A.
August	1,870	1,490	1,710	105,000	A.
September	1,470	1,010	1,180	70,200	A.
The year	3,240	315	1,430	1,040,000	

NOTE.—See footnote to table of daily discharge.

BOISE RIVER NEAR HIGHLAND, IDAHO.

LOCATION.—In sec. 32, T. 3 N., R. 4 E., Ada County, one-fourth mile above Smythe's ranch, half a mile below Kirks, the nearest station on the Boise & Arrowrock Railroad, 2 miles below Moore Creek, and about 3 miles southwest of the old Highland post office.

DRAINAGE AREA.—2,650 square miles (measured on topographic maps).

RECORDS AVAILABLE.—December 15, 1894, to October 31, 1904, at the old station near Boise, 8 miles downstream; March 18, 1905, to August 24, 1915. at the station herein described; August 25 to September 30, 1915, at a new site, 1½ miles upstream.

GAGE.—Friez water-stage recorder installed on left bank March 21, 1915, and used until August 24. August 25 to September 30, 1915, vertical staff installed on left bank about 1½ miles farther upstream and at a different datum. March 18 to July 31, 1905, a temporary gage on right bank below Smythe's house; August 1, 1905, to November 21, 1909, sloping gage at different datum on right bank about one-fourth mile above Smythe's house; November 22, 1909, to March 20, 1915, vertical and inclined staffs on left bank about 50 feet farther upstream and reading the same at low stages as the one across the river at the same datum but 50 feet below the water-stage recorder. Edgar Kirk, observer.

DISCHARGE MEASUREMENTS.—Made from a cable about 50 feet above the Friez gage.

CHANNEL AND CONTROL.—Bed of stream composed of sand, gravel, and boulders. Control shifts frequently, owing to deposition or washing out of tailings from placer mines above. One channel at all stages.

EXTREMES OF DISCHARGE.—Maximum stage recorded during year, 7.54 feet at 3 a. m. June 26; maximum discharge recorded during year, 3,650 second-feet at 11 a. m. April 20, at gage height 7.16 feet. Minimum discharge 463 second-feet December 17 and 21 (gage height 3.2 and 3.3; ice present); minimum stage recorded, 3.01 feet at 9 a. m. February 28.

1905–1915: Maximum stage recorded, 13.7 feet April 15, 1907 (discharge, 17,000 second-feet); minimum stage recorded, 2.7 feet December 10 and 11, 1905 (discharge, 450 second-feet).

A maximum discharge of 40,100 second-feet occurred June 14, 1896, at the old station near Boise.

Winter flow.—Stage-discharge relation at times seriously affected by ice; flow estimated from discharge measurements, observer's notes, and weather records.

Diversions.—No important diversions above the station. The New York canal of the Boise project, United States Reclamation Service, diverts about 6 miles below and has a maximum capacity of about 2,500 second-feet. Below this a number of smaller canals divert from the river, their total maximum capacity amounting to about 2,500 second-feet.

Regulation.—Flow since February 21, 1915, regulated at Arrowrock dam, about 6 miles above.

Accuracy.—Stage-discharge relation not permanent, changes being well defined by numerous discharge measurements. Affected by ice December 15 to about February 10. Several well-defined rating curves used. Mean daily gage heights March 21 to August 24 obtained by inspecting recorder graph. Daily discharge ascertained by applying mean daily gage heights to rating tables or by shifting-control method. Open-water records good; winter records fair.

Cooperation.—Numerous discharge measurements made by employees of the United States Reclamation Service and of the Idaho State engineer.

Discharge measurements of Boise River near Highland, Idaho, during the year ending Sept. 30, 1915.

Date.	Made by—	Gage height.	Discharge.	Date.	Made by—	Gage height.	Discharge.
		Feet.	*Sec.-ft.*			*Feet.*	*Sec.-ft.*
Oct. 1	Purton and Price	3.93	920	June 26	A. C. Price	7.54	3,380
Jan. 9	L. W. Roush	[a] 4.09	925	30	do	7.28	3,130
Feb. 20	A. C. Price	[a] 4.30	1,110	July 3	do	7.21	3,070
24	Purton and Price	3.48	707	8	Lakin and Price	7.15	3,080
25	do	3.53	696	9	E. T. Lakin	7.16	3,140
26	Baldwin and Price	3.26	584	10	do	7.12	3,060
27	Price and Steward	3.15	561	11	do	7.08	3,010
Mar. 4	D. J. Paul	4.15	1,130	13	do	6.80	2,730
8	do	3.78	817	14	do	6.77	2,720
21	A. W. Harrington	4.78	1,520	17	A. W. Harrington	6.28	2,260
25	Paul and Elford	5.43	2,080	18	E. T. Lakin	6.24	2,150
Apr. 7	G. C. Baldwin	5.64	2,130	19	do	6.23	2,070
9	Steward and Price	6.09	2,570	20	do	6.20	2,070
17	A. W. Harrington	6.54	2,930	20	Price and Lakin	6.19	2,000
24	Price and Elford	7.10	3,490	21	E. T. Lakin	6.16	2,020
29	do	6.77	3,050	22	do	6.14	1,990
May 4	Steward and Price	6.09	2,420	24	Price and Steward	6.19	2,010
6	A. W. Harrington	5.89	2,150	26	E. T. Lakin	6.30	2,100
14	Price and Tallman	4.96	1,470	27	do	6.13	1,990
15	A. W. Harrington	5.08	1,480	28	do	6.10	1,960
25	A. C. Price	5.81	2,000	29	do	6.06	1,990
June 4	Price and Tallman	6.45	2,490	30	do	6.03	1,930
11	G. C. Baldwin	7.30	3,490	Aug. 20	G. C. Baldwin	5.77	1,760
16	A. C. Price	7.24	3,280				

[a] Stage-discharge relation affected by ice.

Note.—Price, Paul, Steward, and Elford were employees of the United States Reclamation Service; Tallman and Lakin of the Idaho State engineer.

Daily discharge, in second-feet, of Boise River near Highland, Idaho, for the year ending Sept. 30, 1915.

Day.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.
1	898	1,170	898	......	......	651	2,060	2,390	2,120	3,170	2,020	1,440
2	961	1,100	783	......	......	651	2,110	2,350	2,420	3,170	1,980	1,440
3	1,170	1,100	898	......	......	746	2,150	2,380	2,450	3,040	1,980	1,540
4	1,100	1,100	1,100	......	......	1,120	2,230	2,400	2,550	3,060	1,890	1,520
5	1,030	1,100	1,030	......	......	980	2,220	2,400	2,770	3,090	1,760	1,490
6	1,030	1,100	961	......	......	980	2,050	2,230	3,140	3,100	1,710	1,460
7	1,030	1,030	783	......	......	980	2,080	2,200	3,390	3,130	1,720	1,440
8	1,030	1,030	731	......	......	856	2,170	2,230	3,260	3,150	1,770	1,340
9	1,030	1,030	683	......	......	856	2,410	2,360	3,500	3,030	1,820	1,290
10	1,030	961	638	......	......	916	2,560	2,220	3,500	3,030	1,780	1,200
11	1,100	961	783	......	1,050	1,050	2,540	1,940	3,490	3,030	1,740	1,180
12	1,030	961	961	......	980	1,120	2,570	1,870	3,460	2,820	1,800	1,170
13	1,030	1,030	731	......	980	1,120	2,720	1,700	3,440	2,730	1,840	1,150
14	1,030	1,030	638	......	856	1,190	2,820	1,460	3,150	2,730	1,800	1,060
15	961	961	......	898	746	1,190	2,790	1,490	3,000	2,620	1,800	1,100
16	961	788	......	1,030	856	1,270	2,720	1,480	3,230	2,500	1,810	1,150
17	961	839	......	898	980	1,350	3,000	1,640	3,450	2,220	1,810	1,150
18	1,170	898	......	......	......	1,350	3,100	1,910	3,430	2,120	1,780	1,130
19	1,410	731	......	......	......	1,610	3,340	2,150	3,530	2,120	1,780	1,120
20	1,330	839	......	......	......	1,610	3,570	2,070	3,500	2,060	1,790	1,100
21	1,410	839	......	......	1,120	1,540	3,540	2,010	3,480	2,010	......	1,100
22	1,410	839	......	......	1,120	1,660	3,520	1,990	3,450	2,010	......	1,100
23	1,330	961	......	......	1,050	1,880	3,490	1,970	3,280	2,010	......	1,060
24	1,250	1,030	......	......	651	2,010	3,480	2,060	3,260	2,060	......	1,020
25	1,250	961	......	......	697	2,110	3,480	1,990	3,230	2,120	1,740	1,030
26	1,170	961	......	......	609	2,100	3,480	1,970	3,340	2,170	1,690	1,040
27	1,170	898	......	......	570	2,030	3,480	1,950	3,220	2,060	1,640	1,150
28	1,170	961	......	......	501	2,020	3,220	1,930	3,240	1,960	1,640	1,200
29	1,100	1,030	......	......	......	2,110	3,090	2,010	3,140	1,910	1,640	1,150
30	1,100	961	......	......	......	1,990	2,700	1,990	3,170	1,910	1,640	1,100
31	1,170	......	......	......	......	1,980	......	1,980	......	2,020	1,540	......

NOTE.—Discharge estimated, on account of ice, from weather records, observer's notes, and discharge measurements as follows: Dec. 15–23, 532 second-feet; Dec. 24–31, 774 second-feet; Jan. 1–14, 886 second-feet; Jan. 18–31, 726 second-feet; Feb. 1–5, 992 second-feet; Feb. 6–10, 1,040 second-feet; Feb. 18–20, 1,090 second-feet. Discharge, Aug. 21–24, estimated at 1,770 second-feet. Discharge interpolated on various days between Aug. 25 and Sept. 30.

Monthly discharge of Boise River near Highland, Idaho, for the year ending Sept. 30, 1915.

Month.	Discharge in second-feet.			Run-off (total in acre-feet).	Accuracy.
	Maximum.	Minimum.	Mean.		
October	1,410	898	1,120	68,900	A.
November	1,170	731	973	57,900	A.
December	1,100	....	729	44,800	C.
January	1,030	....	819	50,400	C.
February	1,120	501	936	52,000	B.
March	2,110	651	1,390	85,500	A.
April	3,570	2,050	2,820	168,000	A.
May	2,400	1,460	2,020	124,000	A.
June	3,530	2,120	3,190	190,000	A.
July	3,170	1,910	2,520	155,000	A.
August	2,020	1,540	1,770	109,000	A.
September	1,540	1,020	1,210	72,000	A.
The year	3,570	....	1,630	1,180,000	

NOTE.—See footnote to table of daily discharge.

COTTONWOOD CREEK NEAR ARROWROCK, IDAHO.

Location.—In sec. 35, T. 4 N., R. 5 E., Boise County, 200 feet above the bridge where the Twin Springs-Arrowrock road crosses the creek and one-fourth mile north of the south boundary of the Boise National Forest; 1½ miles above mouth of creek and about 13 miles, by road, from Arrowrock.

Drainage area.—23 square miles (measured on topographic maps).

Records available.—March 7, 1914, to September 30, 1915.

Gage.—Vertical staff reading from 0.0 to 3.0 feet, spiked to a large cottonwood tree on left bank, 15 feet from road; read by Mrs. Eldora Hedrock.

Discharge measurements.—Made by wading, usually at a section about 100 feet above the gage.

Channel and control.—Bed consists of boulders and gravel with pockets of fine sand; rough. Control shifts during high stages. No weeds grow in channel, but backwater from drift on control may be expected at times. A reinforced concrete artificial control was completed about 15 feet below the gage October 24, 1915.

Extremes of discharge.—Maximum stage during year, 1.00 foot at 8 a. m. May 19 (discharge, 29 second-feet); minimum stage, 0.03 foot August 12 to 15 (discharge, 0.4 second-foot).

1914–15: Maximum stage recorded, 1.95 feet at 6 p. m. April 15, 1914 (discharge, 108 second-feet); minimum stage recorded August 12–15, 1915.

Winter flow.—Observations discontinued December 13 to February 28. Stage-discharge relation apparently not affected by ice during period of record.

Diversions.—No known diversions above gage. One small ditch diverts water at brush dam 250 feet below gage.

Regulation.—None.

Accuracy.—Stage-discharge relation not permanent; four fairly well-defined rating curves used during the year. Gage-height record inaccurate at times. Daily discharge ascertained by applying daily gage heights to rating table or by shifting-control method. Records fair.

Cooperation.—Some discharge measurements were made by engineers of the United States Reclamation Service.

Discharge measurements of Cottonwood Creek near Arrowrock, Idaho, during the year ending Sept. 30, 1915.

Date.	Made by—	Gage height.	Discharge.	Date.	Made by—	Gage height.	Discharge.
		Feet.	*Sec.-ft.*			*Feet.*	*Sec.-ft.*
Jan. 12	A. W. Harrington	0.36	4.1	July 1	Price and Elford	0.38	4.9
Mar. 24	.....do	.76	14.4	15	Harrington and Price	.29	3.2
April 12	.....do	.77	13.6	29	A. C. Price	.15	1.3
May 26	W. G. Steward	.87	21.4	Aug. 21	Baldwin and Hoyt	.07	.6
June 14	Steward and Price	.58	9.6				

Note.—Steward, Price, and Elford were employees of the United States Reclamation Service.

Daily discharge, in second-feet, of Cottonwood Creek near Arrowrock, Idaho, for the year ending Sept. 30, 1915.

Day.	Oct.	Nov.	Dec.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.
1	2.2	3.5	4.0	6.4	12	13	18	5.0	2.1	1.0
2	3.0	3.9	3.9	6.4	14	13	16	4.1	1.7	1.6
3	4.4	3.9	3.9	6.4	14	12	16	3.7	1.5	1.4
4	3.7	4.0	3.7	6.6	14	11	15	4.1	1.2	1.2
5	3.1	4.0	3.7	6.6	13	11	14	3.7	1.2	1.2
6	3.0	4.0	3.5	6.4	14	11	13	4.4	1.2	1.0
7	3.0	4.0	3.5	6.4	14	11	12	5.9	1.1	.8
8	3.0	4.0	3.5	6.4	13	10	12	4.4	.8	.8
9	3.0	4.0	3.3	6.6	13	11	11	5.0	.8	1.0
10	3.0	4.0	3.3	6.6	13	14	10	4.1	.7	1.0
11	3.0	4.0	3.3	7.1	13	14	10	4.1	.6	1.4
12	3.0	4.0	3.3	7.1	13	15	12	3.7	.6	2.4
13	3.0	4.0	....	7.4	18	17	11	3.5	.5	3.7
14	3.0	4.0	....	7.4	16	23	9.9	3.3	.5	3.0
15	2.6	4.2	....	7.9	14	22	8.2	3.2	.5	1.8
16	2.6	4.2	....	8.5	15	21	8.2	3.0	.5	1.6
17	2.6	4.2	....	8.8	14	22	7.6	2.7	.5	1.5
18	3.0	4.2	....	9.6	14	27	7.6	2.7	.6	1.4
19	3.1	4.2	....	9.6	14	28	7.9	2.4	.6	1.4
20	3.1	4.2	....	10	14	27	7.6	2.4	.8	1.4
21	3.3	4.2	....	11	14	25	7.6	2.1	.6	1.3
22	3.5	4.0	....	12	13	23	6.6	2.1	.6	1.3
23	3.3	4.0	....	13	12	24	5.9	1.8	.6	1.3
24	3.3	4.0	....	14	12	25	5.4	1.8	1.2	1.6
25	3.0	4.0	....	14	12	23	5.9	1.6	.8	1.6
26	3.1	4.0	....	13	11	21	5.7	1.3	.7	1.8
27	3.3	4.0	....	14	11	19	5.7	1.0	.6	1.8
28	3.5	4.0	....	14	11	20	5.2	1.0	.6	1.8
29	3.5	4.0	....	16	11	20	5.4	1.1	.5	1.8
30	3.5	4.0	....	14	13	17	5.2	1.2	.5	1.8
31	3.5	....	....	13	....	16	....	2.1	.5	....

NOTE.—No record obtained Dec. 13 to Feb. 28.

Monthly discharge of Cottonwood Creek near Arrowrock, Idaho, for the year ending Sept. 30, 1915.

[Drainage area, 23 square miles.]

Month.	Discharge in second-feet.				Run-off.		Accuracy.
	Maximum.	Minimum.	Mean.	Per square mile.	Depth in inches on drainage area.	Total in acre-feet.	
October	4.4	2.2	3.14	0.137	0.158	193	C.
November	4.2	3.5	4.02	.175	.195	239	C.
December 1-12	4.0	3.3	3.58	.156	.070	85.2	D.
March	16	6.4	9.55	.415	.478	587	C.
April	18	11	13.3	.578	.645	791	C.
May	28	10	18.3	.796	.918	1,130	B.
June	18	5.2	9.52	.414	.462	566	B.
July	5.9	1.0	2.98	.130	.150	183	C.
August	2.1	.5	0.813	.035	.040	50.0	D.
September	3.7	.8	1.56	.068	.076	92.8	D.

SOUTH FORK OF BOISE RIVER NEAR LENOX, IDAHO.

LOCATION.—In sec. 24, T. 2 N., R. 6 E., in the canyon at R. S. Sandlin's ranch, 1 mile above mouth of Smith Creek, 4 miles above flow line of Arrowrock reservoir, 14 miles above mouth of South Fork, and 18 miles above Arrowrock dam. The station is about 7 miles south of Lenox post office, Elmore County, and it was originally described as "near Prairie," Idaho.

DRAINAGE AREA.—1,090 square miles (measured on topographic maps).

RECORDS AVAILABLE.—March 24, 1911, to September 30, 1915.

GAGE.—Friez water-stage recorder on right bank; installed April 11, 1915, at the same datum as the original inclined gage but about 25 feet downstream. Observer, R. S. Sandlin.

DISCHARGE MEASUREMENTS.—Made by wading or from a cable 100 feet upstream from gage.

CHANNEL AND CONTROL.—Bed consists of mud and gravel, one channel at all stages. The control consists of rock and coarser material and is practically permanent.

EXTREMES OF DISCHARGE.—Maximum stage recorded during year, 5.20 feet at 10 p. m. May 18 (discharge, 2,100 second-feet); minimum stage recorded, 2.04 feet at 10 a. m. August 31 (discharge, 266 second-feet).

1911–1915: Maximum stage recorded, 8.4 feet June 13, 1911 (discharge, 6,420 second-feet); minimum stage recorded August 31, 1915.

WINTER FLOW.—Stage-discharge relation seriously affected by ice for short periods only.

DIVERSIONS.—None of importance either above or below gage.

REGULATION.—None.

ACCURACY.—Stage-discharge relation practically permanent; affected by ice December 15 to January 29. Rating curve well defined. Mean daily gage heights obtained by inspecting recorder graph. Daily discharge ascertained by applying mean daily gage heights to rating table, except for period during which stage-discharge relation was affected by ice. Records for April to September excellent, for other months fair.

COOPERATION.—Occasional discharge measurements are made by employees of the United States Reclamation Service.

Discharge measurements of South Fork of Boise River near Lenox, Idaho, during the year ending Sept. 30, 1915.

Date.	Made by—	Gage height.	Discharge.	Date.	Made by—	Gage height.	Discharge.
		Feet.	*Sec.-ft.*			*Feet.*	*Sec.-ft.*
Jan. 14	A. W. Harrington	[a]2.51	342	July 2	Price and Elford	3.28	703
Apr. 7	do	4.08	1,160	16	Harrington and Price	2.91	517
9	do	4.00	1,120	30	A. C. Price	2.44	334
May 6	Steward and Price	4.15	1,240	Aug. 13	do	2.22	258
27	A. C. Price	4.51	1,440	22	G. C. Baldwin	2.14	250
June 15	Steward and Price	3.88	1,100				

[a] Stage-discharge relation affected by ice.

NOTE.—Steward, Price, and Elford were employees of the United States Reclamation Service.

Daily discharge, in second-feet, of South Fork of Boise River near Lenox, Idaho, for the year ending Sept. 30, 1915.

Day.	Oct.	Nov.	Dec.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.
1	391	469	355	416	391	869	1,770	1,860	736	373	237
2	430	469	355	429	391	928	1,600	1,910	715	366	307
3	469	469	391	420	391	1,050	1,440	1,730	704	338	304
4	469	469	429	410	391	1,190	1,370	1,560	694	319	286
5	429	469	391	397	391	1,120	1,290	1,440	673	310	281
6	429	449	373	385	391	1,120	1,220	1,440	736	304	272
7	429	449	355	373	391	1,190	1,150	1,440	730	304	282
8	429	429	322	401	391	1,120	1,120	1,480	736	292	264
9	429	429	322	429	391	1,120	1,150	1,520	684	284	254
10	429	449	307	410	410	1,120	1,290	1,480	704	278	256
11	429	410	322	391	429	1,190	1,480	1,400	638	275	256
12	449	429	322	373	449	1,260	1,520	1,330	595	272	262
13	430	469	322	355	469	1,400	1,820	1,260	576	270	284
14	410	449	307	346	469	1,480	1,910	1,120	580	267	292
15	400	418	......	338	469	1,400	1,860	1,050	534	264	254
16	391	386	......	364	490	1,480	1,770	1,050	516	262	281
17	391	355	......	391	512	1,640	1,770	1,080	482	249	275
18	486	338	......	410	534	1,640	2,000	1,080	478	244	270
19	580	322	......	429	557	1,640	2,050	1,080	465	239	262
20	568	322	......	429	604	1,690	1,860	1,050	445	239	259
21	557	307	......	429	604	1,730	1,820	1,050	425	242	259
22	546	322	......	410	704	1,690	1,730	989	410	242	256
23	534	338	......	391	816	1,600	1,690	989	395	239	256
24	512	355	......	391	928	1,400	1,730	989	387	246	259
25	512	391	......	391	869	1,330	1,640	989	369	262	270
26	469	391	......	391	869	1,290	1,560	989	359	264	278
27	512	391	......	391	812	1,290	1,480	898	345	249	335
28	490	391	......	391	869	1,370	1,520	812	338	242	325
29	469	382	......	......	1,190	1,520	1,640	779	332	235	307
30	469	373	......	......	1,120	1,820	1,640	752	332	230	296
31	469	......	......	......	928	......	1,690	......	335	230	......

NOTE.—Discharge estimated, because of ice, from discharge measurement, weather records, and observer's notes as follows: Dec. 15–24, 268 second-feet; Dec. 25–31, 330 second-feet; Jan. 1–15, 338 second-feet; Jan. 16–26, 279 second-feet; Jan. 27–29, 345 second-feet. Discharge interpolated on numerous days from Oct. 1 to Mar. 23.

Monthly discharge of South Fork of Boise River near Lenox, Idaho, for the year ending Sept. 30, 1915.

[Drainage area, 1,090 square miles.]

Month.	Discharge in second-feet.				Run-off.		Accuracy.
	Maximum.	Minimum.	Mean.	Per square mile.	Depth in inches on drainage area.	Total in acre-feet.	
October	580	391	465	0.427	0.49	28,600	B.
November	469	307	403	.370	.41	24,000	B.
December	429	......	318	.292	.34	19,600	C.
January	......	......	322	.295	.34	19,800	C.
February	429	338	396	.363	.38	22,000	B.
March	1,190	391	601	.551	.64	37,000	B.
April	1,820	869	1,360	1.25	1.40	80,900	A.
May	2,050	1,120	1,600	1.47	1.70	98,400	A.
June	1,910	752	1,220	1.12	1.25	72,600	A.
July	736	332	531	.487	.56	32,600	A.
August	373	230	272	.250	.29	16,700	A.
September	335	237	276	.253	.28	16,400	A.
The year	2,050	230	647	594	8.08	469,000	

NOTE.—See footnote to table of daily discharge.

MOORE CREEK NEAR ARROWROCK, IDAHO.

Location.—In sec. 21, T. 3 N., R. 4 E., Boise County, one-fourth mile above highway bridge on Boise-Arrowrock road, half a mile above mouth, and about 5 miles southwest of Arrowrock.,

Drainage area.—426 square miles (measured on topographic maps).

Records available.—October 1, 1914, to September 30, 1915 (discharge measurements only).

Gage.—Graduations to feet and tenths chiseled on the face of a rock ledge on the left bank of the stream and marked with white paint.

Discharge measurements.—Made by wading near gage or from highway bridge one-fourth mile below.

Channel and control.—Bed consists of boulders, cobbles and sand. Control shifts frequently owing to deposition of sand in low stages and cutting out in high stages. Stream usually carries much sand and silt as a result of placer operations in Boise Basin. One channel at all stages.

Winter flow.—Stage-discharge relation ordinarily not seriously affected by ice. Effect of ice presumably diminished by the proximity of a group of hot springs just above station.

Diversions.—No important diversions above station.

Regulation.—None.

Cooperation.—Discharge measurements made during year by employees of United States Reclamation Service.

Discharge measurements of Moore Creek near Arrowrock, Idaho, during the year ending Sept. 30, 1915.

Date.	Made by—	Gage height.	Discharge.	Date.	Made by—	Gage height.	Discharge.
		Feet.	*Sec.-ft.*			*Feet.*	*Sec.-ft.*
Oct. 1	Purton and Price	1.11	56.8	Aug. 1	E. T. Lakin	1.15	55.2
Jan. 9	A. W. Harrington	1.22	79.0	2	.....do	1.08	48.1
Feb. 23	Purton and Price	1.95	137	3	.....do	1.04	48.1
24	.....do	1.97	141	4	.....do	1.01	41.5
25	.....do	2.08	135	6	.....do	.93	34.0
26	Baldwin and Price	2.10	181	11	.....do	.87	26.3
26	.....do	2.10	150	12	.....do	.81	25.8
27	Price and Steward	2.10	170	13	.....do	.81	26.5
27	G. C. Baldwin	2.10	165	16	.....do	.78	22.0
Apr. 9	W. G. Steward	2.71	334	19	.....do	.73	20.3
17	Price and Elford	3.00	400	26	.....do	.70	22.9
24	.....do	2.60	311	27	.....do	.70	19.2
29	.....do	2.43	296	30	Lakin and McConnel	.67	17.8
May 4	Price and Steward	2.37	258	31	W. N. McConnel	.69	18.8
14	Price and Tallman	4.10	900	Sept. 1	.....do	.76	24.4
15	C. F. Elford	3.85	841	2	.....do	1.02	42.8
25	Price and Steward	3.65	585	3	.....do	.88	34.0
June 30	.....do	1.60	129	7	.....do	.82	28.8
July 3	Price and Elford	1.45	95.4	8	.....do	.79	25.8
6	A. C. Price	1.47	98.7	9	.....do	.79	25.1
8	Lakin and Price	1.62	121	10	.....do	.81	27.6
9	E. T. Lakin	1.73	139	13	.....do	.91	34.0
11	.....do	1.53	116	14	.....do	.91	36.1
12	.....do	1.47	101	15	.....do	.92	35.8
13	.....do	1.45	89.3	16	.....do	.92	35.1
14	.....do	1.40	82.2	17	.....do	.92	38.2
17	.....do	1.30	78.7	20	.....do	.89	32.0
19	.....do	1.25	79.4	21	.....do	.88	30.9
20	Price and Lakin	1.21	61.0	22	.....do	.88	31.4
23	E. T. Lakin	1.10	47.3	23	.....do	.88	31.3
24	.....do	1.05	43.8	24	.....do	.88	32.5
26	.....do	1.00	34.4	27	.....do	.96	37.2
28	.....do	.99	37.8	28	.....do	.96	37.5
30	.....do	.98	36.9	29	.....do	.98	38.5

Note.—Steward, Price and Elford were employees of the United States Reclamation Service; Tallman, Lakin and McConnel, of the Idaho State engineer.

MALHEUR RIVER AT WARM SPRINGS RESERVOIR SITE, NEAR RIVERSIDE, OREG.

Location.—In sec. 7, T. 23 S., R. 37 E., 500 feet above the dam site of the proposed Warm Springs reservoir, 2 miles south of Armstrong's house, 4 miles above mouth of South Fork, and 5 miles northwest of Riverside.

Drainage area.—About 1,100 square miles.

Records available.—December 9, 1914, to September 30, 1915. From January 3, 1906, to March 31, 1907, and from December 15, 1908, to May 25, 1910, records were obtained at a station about 4 miles below.

Gage.—Stevens water-stage recorder on left bank. Staff gage about 200 feet above mouth of South Fork, used 1906 to 1910. E. L. Armstrong, observer.

Discharge measurements.—Made by wading or from cable half a mile below gage.

Channel and control.—Gravel and small stones likely to shift in floods. One channel for medium and high stages, but during low stages water crosses riffle in two or more channels.

Extremes of discharge.—Maximum stage, from water-stage recorder, 3.20 feet at 9 a. m., April 5 (discharge, 820 second-feet); minimum stage recorded, 0.73 foot July 28 to 30 (discharge, 4 second-feet).

1906–1915: Maximum discharge, 5,490 second-feet for a stage of 10 feet on lower gage March 2, 1910; minimum discharge, 2 second-feet August 5 to 30, 1909.

Winter flow.—Stage-discharge relation seriously affected by ice; flow estimated from discharge measurements, observer's notes, and weather records.

Diversions.—A large area of bottom land is irrigated with flood water above this station.

Regulation.—None.

Accuracy.—Stage-discharge relation not changed during the year; affected by ice December 9 to February 23. Rating curve fairly well defined between 5 and 100 second-feet and well defined between 100 and 1,500 second-feet. Gage read about twice weekly during winter; operation of recorder satisfactory beginning March 1. Daily discharge ascertained by applying gage heights to rating table. Records good for open water and poor for winter.

Discharge measurements of Malheur River at Warm Springs reservoir site, near Riverside, Oreg., during the year ending Sept. 30, 1915.

Date.	Made by—	Gage height.	Discharge.	Date.	Made by—	Gage height.	Discharge.
		Feet.	*Sec.-ft.*			*Feet.*	*Sec.-ft.*
Dec. 9	A. W. Harrington	[a]1.23	34.9	Mar. 9	L. W. Roush	1.44	119
Jan. 24	do	[a]1.64	34.9	Apr. 20	A. W. Harrington	1.62	185
25	do	[a]1.63	37.6	21	do	1.60	180
Mar. 9	L. W. Roush	1.46	118	Aug. 29	do	.82	7.0

[a] Stage-discharge relation affected by ice.

Daily discharge, in second-feet, of Malheur River at Warm Springs reservoir site, near Riverside, Oreg., for the year ending Sept. 30, 1915.

Day.	Dec.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.
1				152	510	176	145	15	6	9
2				187	510	176	131	14	9	10
3				176	530	184	117	12	12	10
4				176	686	176	101	10	12	10
5				212	739	180	80	10	10	10
6				138	578	166	75	10	9	8
7				124	494	145	65	12	8	7
8				120	478	128	60	12	7	8
9	35			124	406	134	55	12	7	8
10				128	362	145	52	24	6	8
11				142	346	187	50	15	6	11
12				170	334	229	45	12	6	13
13				201	322	278	46	10	6	16
14				306	302	302	55	8	5	17
15				458	266	314	53	7	7	18
16				550	243	314	48	7	8	19
17				466	229	294	43	6	7	20
18				402	218	286	40	6	8	21
19				382	208	278	36	7	9	21
20				330	190	258	34	6	8	21
21				346	184	243	32	5	7	22
22				382	184	232	32	5	6	23
23				414	180	232	29	4	7	23
24		35	180	498	180	222	26	4	7	23
25		38	171	506	173	215	21	5	7	23
26			162	394	159	212	15	5	7	22
27			154	326	145	194	15	5	6	21
28			145	322	134	187	15	5	6	23
29				442	120	176	15	4	7	23
30				634	131	170	15	5	7	24
31				522		159		5	8	

NOTE.—Discharge estimated, on account of ice, as follows: Dec. 10–15, 40 second-feet; Dec. 16–25, 30 second-feet; Dec. 26–31, 60 second-feet; Jan. 1–20, 45 second-feet; Jan. 21–23, 40 second-feet; Jan. 26–31, 40 second-feet; Feb. 1–2, 90 second-feet; Feb. 3–23, 120 second-feet.

Monthly discharge of Malheur River at Warm Springs reservoir site, near Riverside, Oreg., for the year ending Sept. 30, 1915.

Month.	Discharge in second-feet.			Run-off (total in acre-feet).	Accuracy.
	Maximum.	Minimum.	Mean.		
December 9–31			40.7	1,860	D.
January			43.0	2,640	D.
February			125	6,940	D.
March	634	120	314	19,300	A.
April	739	120	318	18,900	A.
May	314	128	213	13,100	A.
June	145	15	51.5	3,060	A.
July	24	4	8.6	529	B.
August	12	5	7.5	461	B.
September	24	7	16.4	976	A.
The period				67,800	

MALHEUR RIVER AT RIVERSIDE, OREG.

Location.—In sec. 22, T. 23 S., R. 37 E., at the county highway bridge 100 yards below mouth of South Fork and 1 mile northwest of Riverside townsite, in Malheur County.

Drainage area.—About 1,910 square miles (measured on Land Office maps).

Records available.—January 16, 1909, to January 23, 1915, when station was discontinued.

Gage.—Chain gage on downstream side of highway bridge; read daily by W. L. Blaylock. The original gage (used January 16, 1909, to June 12, 1910), was a vertical staff attached to the right bridge abutment. The chain gage, which has been used since June 12, 1910, is referred to practically the same datum as the original staff.

Discharge measurements.—Made from the highway bridge or by wading.

Channel and control.—Bed of stream and control consist of gravel and cobbles; shift in high water and as a result of ice jams. One channel at all stages.

Extremes of discharge.—Maximum discharge recorded October to January: 98 second-feet October 4–12 (gage height 1.6 feet): minimum discharge presumably occurred during December, when stage-discharge relation was affected by ice.

1909–1915: Maximum stage recorded, 11.6 feet, morning of March 2, 1910, from high-water marks (discharge estimated from extension of rating curve as 16,400 second-feet); minimum discharge recorded, 2.6 second-feet July 28 to August 5, 1914 (gage height, 0.7 foot).

Winter flow.—Stage-discharge relation seriously affected by ice; flow estimated from discharge measurements, observer's notes, and comparison with records at other stations.

Diversions.—Numerous ranch diversions are made from both South Fork and Malheur River above station.

Regulation.—None.

Accuracy.—Records for October and November, fair; those for December and January poor.

Discharge measurements of Malheur River at Riverside, Oreg., during the year ending Sept. 30, 1915.

[Made by A. W. Harrington.]

Date.	Gage height.	Discharge.
	Feet.	*Sec.-ft.*
Dec. 10	[a] 1.95	65.8
Jan. 23	[a] 2.56	65.0

[a] Stage-discharge relation affected by ice.

Daily discharge, in second-feet, of Malheur River at Riverside, Oreg., for the year ending Sept. 30, 1915.

Day.	Oct.	Nov.	Day.	Oct.	Nov.	Day.	Oct.	Nov.
1	63	80	11	98	80	21	80	71
2	63	80	12	98	80	22	80	
3	63	80	13	63	80	23	80	
4	98	80	14	63	80	24	80	
5	98	80	15	63	80	25	80	
6	98	80	16	63	71	26	80	
7	98	80	17	63	71	27	80	
8	98	80	18	80	71	28	80	
9	98	80	19	80	71	29	80	
10	98	80	20	80	71	30	80	
						31	80	

Note.—Discharge determined from a fairly well defined rating curve. Stage-discharge relation affected by ice Nov. 22 to Jan. 23. Discharge Nov. 22–30 estimated at 70 second-feet.

Monthly discharge of Malheur River at Riverside, Oreg., for the year ending Sept. 30, 1915.

Month.	Discharge in second-feet.			Run-off (total in acre-feet).	Accuracy.
	Maximum.	Minimum.	Mean.		
October	98	63	80.8	4,970	C.
November	80		75.2	4,470	C.
December			[a] 55.0	3,380	D.
January 1-23			[a] 65.0	2,970	D.
The period				15,800	

[a] Mean discharge estimated.

MALHEUR RIVER NEAR NAMORF, OREG.

Location.—In sec. 2, T. 21 S., R. 40 E., at F. J. Froman's ranch, 1 mile south of east portal of tunnel No. 1 on the Oregon & Eastern Railroad, 3 miles west of Namorf flag station, and 15 miles west of Harper post office, Malheur County. North Fork of Malheur River enters near Juntura, 20 miles above.

Drainage area.—2,560 square miles (measured on United States Land Office map).

Records available.—May 24, 1913, to September 30, 1915.

Gage.—Inclined staff on right bank, 300 feet above Froman's house; read by F. J. Froman.

Discharge measurements.—Low-stage measurements made by wading; medium and high-stage measurements made from a flume about 400 feet above gage.

Channel and control.—Control, 400 feet below gage, consists of cobbles and coarse gravel; clean. Channel between riffle and gage and above gage is wide and current is sluggish. One channel at all stages at the gage. Stage of zero flow estimated August 30 at gage height 1.88 feet.

Extremes of discharge.—Maximum stage recorded during year, 4.3 feet April 5–6 (discharge 1,110 second-feet); minimum stage recorded, 2.32 feet July 30 and August 1 (discharge, 18 second-feet).

1913–1915: Maximum stage recorded, 5.8 feet March 18, 1914 (discharge, 2,970 second-feet); minimum discharge recorded, 15 second-feet August 8–10, 1914 (gage height, 2.40 feet).

Winter flow.—Stage-discharge relation seriously affected by ice; flow estimated from discharge measurements, observer's notes, and weather records.

Diversions.—Many small diversions are made from the river and its branches above the gage, the largest being made near Drewsey and from North Fork near Juntura.

Regulation.—None.

Accuracy.—Stage-discharge relation changed during the winter; affected by ice November 21 to February 13. Two fairly well defined rating curves used, one applicable October 1 to November 20, the other February 14 to September 30. Daily discharge ascertained by applying daily gage heights to rating tables. Open-water records good; winter records poor.

Discharge measurements of Malheur River near Namorf, Oreg., during the year ending Sept. 30, 1915.

Date.	Made by—	Gage height.	Discharge.	Date.	Made by—	Gage height.	Discharge.
		Feet.	*Sec.-ft.*			*Feet.*	*Sec.-ft.*
Jan. 27	A. W. Harrington	[a] 3.60	109	Apr. 22	A. W. Harrington	3.38	329
Mar. 11	L. W. Roush	3.25	274	23	.....do	3.40	362
12	.....do	3.30	308	Aug. 30	.....do	2.38	23.5

[a] Stage-discharge relation affected by ice.

Daily discharge, in second-feet, of Malheur River near Namorf, Oreg., for the year ending Sept. 30, 1915.

Day.	Oct.	Nov.	Feb.	Mar.	Apr.	May.	June.	July.	Aug	Sept.
1	104	157	....	276	811	301	312	57	18	25
2	104	157	....	250	635	357	301	57	25	23
3	131	157	....	301	811	346	276	53	25	25
4	139	157	....	329	907	357	250	53	25	25
5	121	146	....	329	1,110	346	276	53	25	27
6	139	146	....	301	1,110	301	182	53	27	31
7	121	157	....	276	859	301	161	53	27	31
8	104	157	....	276	811	276	161	53	25	35
9	139	157	....	250	766	250	154	53	25	37
10	139	146	....	250	635	276	154	53	27	37
11	139	157	....	276	635	346	144	57	31	37
12	139	157	....	301	596	388	144	57	31	37
13	139	157	....	346	556	556	133	57	31	37
14	139	146	301	556	556	556	126	53	31	40
15	139	146	276	720	520	635	126	50	27	53
16	139	146	301	958	484	596	126	45	27	57
17	139	146	312	907	418	556	126	45	27	57
18	139	146	357	811	418	556	112	45	27	57
19	157	146	418	720	406	556	112	45	35	57
20	178	139	451	635	388	484	112	45	63	63
21	178	....	357	720	357	484	112	45	45	63
22	178	....	301	635	346	484	112	45	37	63
23	169	....	260	811	357	451	97	40	35	63
24	169	....	260	811	357	418	97	37	35	63
25	157	....	301	1,010	346	418	85	27	31	53
26	157	....	276	907	329	418	73	27	35	57
27	157	....	276	720	301	406	73	25	27	57
28	157	....	276	635	276	357	63	25	27	57
29	157	....	....	635	260	357	57	20	25	57
30	157	....	....	811	250	346	57	18	24	57
31	157	....	....	1,010	....	329	....	20	23	....

NOTE.—Discharge estimated from measurements, observer's notes, and weather records as follows: Nov. 21-30, 130 second-feet; Dec. 1-31, 100 second-feet; Jan. 1-31, 115 second-feet; Feb. 1-13, 200 second-feet.

Monthly discharge of Malheur River near Namorf, Oreg., for the year ending Sept. 30, 1915.

Month.	Discharge in second-feet.			Run-off (total in acre-feet).	Accuracy.
	Maximum.	Minimum.	Mean.		
October	178	104	145	8,920	B.
November	157	....	144	8,570	C.
December	....	....	100	6,150	D.
January	....	....	115	7,070	D.
February	451	....	262	14,600	C.
March	1,010	250	578	35,200	B.
April	1,110	250	554	33,000	B.
May	635	250	413	25,400	B
June	312	57	144	8,570	B.
July	57	18	44.1	2,710	B.
August	63	18	29.8	1,830	B.
September	63	23	46.0	2,740	B.
The year	1,110	18	214	155,000	

MALHEUR RIVER AT VALE, OREG.

LOCATION.—In sec. 29, T. 18 S., R. 45 E., at the highway bridge at Vale, Malheur County, half a mile below Bully Creek and 2½ miles above Willow Creek.

DRAINAGE AREA.—About 4,860 square miles; watershed not well defined on available maps.

RECORDS AVAILABLE.—March 20, 1890, to June 30, 1891; January 1, 1895, to September 30, 1896; May 20, 1903, to April 1, 1907; May 29, 1908, to October 15, 1914, when station was discontinued.

Gage.—Chain gage on downstream side of bridge; read daily by E. F. Johnson. Datum of gage unchanged since May 20, 1903; prior to this date gage was an inclined staff set on right bank just above bridge at different datum.

Discharge measurements.—Made by wading or from a suspension footbridge about one-fourth mile below gage.

Channel and control.—Bed composed of gravel; shifts. At low stages river flows in two or more channels above and below gage.

Extremes of discharge.—October 1-15: Maximum stage recorded, 3.75 feet October 3 (discharge, 95 second-feet); minimum discharge recorded, 59 second-feet October 1 (corresponding to gage height, 3.62 feet).

1890-1914: Maximum stage recorded, 19.5 feet at 2 a. m. March 2, 1910 (discharge, 22,800 second-feet); minimum stage recorded, 3.18 feet August 23, 1906 (discharge, 4 second-feet); a discharge of 4 second-feet (corresponding to gage height, 0.50 foot) is also recorded in July, 1895.

Winter flow. No winter record in present year.

Diversions.—Many important diversions for irrigation both above and below station.

Regulation.—None.

Accuracy.—Records fair.

Discharge measurements of Malheur River at Vale, Oreg., during the year ending Sept. 30, 1915.

[Made by A. W. Harrington.]

Date.	Gage height.	Discharge.
	Feet.	*Sec.-ft.*
Dec. 13	3.72	90.9
Aug. 26	(a)	26.4

[a] Gage height not determined; chain gage removed in January, 1915.

Daily discharge, in second-feet, of Malheur River at Vale, Oreg., for the year ending Sept. 30, 1915.

Day.	Oct.	Day.	Oct.	Day.	Oct.
1	59	11	85	21	
2	68	12	85	22	
3	95	13	85	23	
4	85	14	80	24	
5	85	15	80	25	
6	85	16		26	
7	61	17		27	
8	61	18		28	
9	72	19		29	
10	85	20		30	
				31	

Note.—Daily discharge determined from a fairly well-defined rating curve, except Oct. 1 to 3, for which it was obtained by shifting-control method. Mean discharge Oct. 1-15, 78.1 second-feet; total run-off, 2,320 acre-feet.

SOUTH FORK OF MALHEUR RIVER AT RIVERSIDE, OREG.

Location.—In sec. 27, T. 23 S., R. 37 E., 1,000 feet above mouth and 1 mile northwest of village of Riverside, Malheur County.

Drainage area.—About 800 square miles (measured on Land Office and other available maps).

Records available.—May 25, 1910, to January 23, 1915, when station was discontinued.

Gage.—Inclined staff on right bank; read daily by W. L. Blaylock. Present gage has been in use since February 16, 1912; prior to that date gage used was a vertical staff in three sections on right bank about 200 feet below site of present gage.

Discharge measurements.—Made by wading or from a cable at site of original gage.

Channel and control.—Bed consists of lava rock and boulders covered with gravel. Control fairly permanent; effect of moss and weeds slight.

Extremes of discharge.—1914–15: Maximum discharge recorded, 20 second-feet October 4 to 12 (corresponding to a gage height of 1.9 feet); minimum stage recorded, 1.65 feet at time of measurement August 27 (discharge, 7.8 second-feet). Lower discharges, of which there is no record, probably occurred during the summer.

1910–1915: Maximum stage recorded, 6.1 feet April 25, 1912 (discharge, 1,990 second-feet); minimum stage recorded, 1.00 foot July 30 to August 1, 1914 (discharge, zero); zero discharge also recorded July 18 to 20, 1913, at gage height 1.20 feet.

Winter flow.—Stage-discharge relation seriously affected by ice; flow estimated from discharge measurements, observer's notes, and weather records.

Diversions.—Practically entire summer flow of stream is used for irrigation by ranches above station.

Regulation.—None.

Accuracy.—Open-water records good, winter records poor. Rating curve well defined but gage-height record only fair.

Discharge measurements of South Fork of Malheur River at Riverside, Oreg., during the year ending Sept. 30, 1915.

[Made by A. W. Harrington.]

Date.	Gage height.	Discharge.
	Feet.	*Sec.-ft.*
Dec. 11	[a] 2.12	15.0
Jan. 23	[a] 1.97	9.17
Aug. 27	1.65	7.77

[a] Stage-discharge relation affected by ice.

Daily discharge, in second-feet, of South Fork of Malheur River at Riverside, Oreg., for the year ending Sept. 30, 1915.

Day.	Oct.	Nov.	Day.	Oct.	Nov.	Day.	Oct.	Nov.
1	17	14	11	20	14	21	14	14
2	17	14	12	20	14	22	14	......
3	17	14	13	14	14	23	14	......
4	20	14	14	14	14	24	14	......
5	20	14	15	14	14	25	14	......
6	20	14	16	14	14	26	14	......
7	20	14	17	14	14	27	14	......
8	20	14	18	14	14	28	14	......
9	20	14	19	14	14	29	14	......
10	20	14	20	14	14	30	14	......
						31	14	......

Note.—Daily discharge determined from a fairly well defined rating curve. Discharge Nov. 22-30 estimated at 14 second-feet.

Monthly discharge of South Fork of Malheur River at Riverside, Oreg., for the year ending Sept. 30, 1915.

Month.	Discharge in second-feet.			Run-off (total in acre-feet).	Accuracy.
	Maximum.	Minimum.	Mean.		
October	20	14	16.0	984	B
November	....	....	14.0	833	C
December	....	....	[a] 12.0	738	D
January 1-23	....	....	[a] 12.0	547	D
The period	....	....	....	3,100	

[a] Discharge estimated.

BULLY CREEK AT WARM SPRINGS, NEAR VALE, OREG.

Location.—In sec. 4, T. 18 S., R. 43 E., one-fourth mile east of Warm Springs stage station on the Vale-Westfall road, one-fourth mile below mouth of Cottonwood Creek, and 14 miles west of Vale, Malheur County.

Drainage area.—569 square miles (measured on Land Office map).

Records available.—August 11, 1903, to March 10, 1904; January 24, 1905, to March 31, 1907; January 1, 1911, to September 30, 1915. Records are also available for a station about 12 miles below from April 8, 1904, to December 31, 1905.

Gage.—Two-section staff gage on left bank, upper inclined and lower vertical; read once daily by F. D. O'Neil and Walter Keele. Several gages have been in use at this station; they have been maintained at present datum since June, 1911, and probably since 1905.

Discharge measurements.—Made from cable or by wading.

Channel and control.—Bed consists of coarse gravel; shifts during high stages; one channel at all stages. Stage-discharge relation seriously affected during the summer months by the heavy growth of aquatic plants in the channel.

Extremes of discharge.—Maximum stage recorded during year, 2.0 feet at 7 a. m., March 15 (discharge, 185 second-feet); minimum stage recorded, 0.50 foot March 19–23 (discharge zero).

1903–15: Maximum stage recorded, 8.6 feet March 1, 1910 (discharge estimated from extension of partially developed rating curve as 6,240 second-feet). Creek dry March 19–23, 1915, owing to water being held back by dam above; water standing in pools August 2 to September 15, 1911, and the discharge at gage during this and other periods probably zero.

Winter flow.—Stage-discharge relation seriously affected by ice. Discharge estimated from discharge measurements, observer's notes, and weather records.

Diversions.—Numerous small ranch diversions are made both above and below the gage. The reservoir of the Vale-Oregon Irrigation Co. is about 3 miles above the gage, but no diversions have yet been made into the company's canals.

Regulation.—Flow regulated to a certain extent by the dam of the Vale-Oregon Irrigation Co., the effect during the past year having apparently been to increase the natural summer flow by storage and gradual release of flood waters.

Accuracy.—Stage-discharge relation not permanent; affected by ice December 13 to January 11, January 15–31, and February 12–15; affected by moss growth June 6 to July 6 and July 17 to September 30. Rating curve fairly well defined used February 1 to June 5 and July 7–16. Gage-height record poor. Daily discharge ascertained by applying daily gage heights to rating table and October 1 to December 12 and January 12–14 by shifting-control method. See footnote to daily discharge table. Records poor.

Discharge measurements of Bully Creek at Warm Springs, near Vale, Oreg., during the year ending Sept. 30, 1915.

Date.	Made by—	Gage height.	Discharge.	Date.	Made by—	Gage height.	Discharge.
		Feet.	*Sec.-ft.*			*Feet.*	*Sec.-ft.*
Dec. 12	A. W. Harrington	0.84	4.94	Apr. 24	A. W. Harrington	0.91	12.3
Jan. 29	do	[a] 1.04	8.33	July 13	do	1.01	6.15
Mar. 13	L. W. Roush	1.42	68.0	Aug. 25	do	1.20	4.73
14	do	1.76	126				

[a] Stage-discharge relation affected by ice.

Daily discharge, in second-feet, of Bully Creek at Warm Springs, near Vale, Oreg., for the year ending Sept. 30, 1915.

Day.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.
1	6	5	2	....	12	12	12	12	15	....
2	6	5	2	....	12	12	12	12	15	....
3	6	5	6	....	12	12	12	12	15	....
4	7	5	4	....	18	13	....	12	15	....
5	7	5	4	....	13	13	....	12	15	....
6	7	5	2	....	13	15	....	12	....	....
7	7	5	4	....	12	12	....	12	....	5
8	9	5	4	....	12	12	....	12	....	5
9	9	5	4	....	12	12	....	12	....	5
10	9	5	4	....	12	13	....	12	....	5
11	9	5	5	....	12	15	12	12	....	5
12	9	6	5	8	....	32	12	12	....	5
13	9	5	....	8	....	64	12	12	....	6
14	7	5	....	8	....	137	18	15	....	6
15	7	2	....	....	....	185	18	18	....	6
16	7	4	....	....	12	160	18	18	....	6
17	7	4	....	....	12	97	12	18	....	....
18	6	4	....	....	12	18	12	18	....	....
19	5	4	....	....	12	0	12	18	....	....
20	5	5	....	....	12	0	18	18	....	....
21	5	4	....	....	12	0	18	18	....	....
22	5	4	....	....	12	0	18	18	....	....
23	5	4	....	....	12	0	12	18	....	....
24	5	8	....	....	12	0	12	12	....	....
25	5	4	....	....	12	7	12	18	....	....
26	5	4	....	....	12	12	12	18	....	....
27	5	4	....	....	12	12	12	18	....	....
28	5	4	....	....	12	12	12	18	....	....
29	5	4	....	8	....	12	15	18	....	....
30	5	2	....	....	....	12	15	18	....	....
31	5	....	....	....	....	12	....	18	....	....

NOTE.—Discharge estimated, on account of ice, from discharge measurements, observer's notes and weather records, as follows: Dec. 13–31, 4 second-feet; Jan. 1–11, 6 second-feet; Jan. 15–28, 9 second-feet; Jan. 30–31, 10 second-feet: Feb. 12–15, 12 second-feet; interpolated Apr. 4–10; estimated on account of growth of aquatic plants as follows: June 6–15, 12 second-feet; June 15-24, 10 second-feet; June 25–30, 8 second-feet; July 1–4, 7 second-feet; July 5–6, 175 second-feet; and July 17–31, 6 second-feet.

Monthly discharge of Bully Creek at Warm Springs, near Vale, Oreg., for the year ending Sept. 30, 1915.

Month.	Discharge in second-feet.			Run-off (total in acre-feet).	Accuracy.
	Maximum.	Minimum.	Mean.		
October	9	5	6.42	395	C.
November	8	0.4	4.41	262	D.
December	....	....	3.94	242	D.
January	....	....	7.87	484	D.
February	18	....	12.3	683	C.
March	185	0	29.5	1,810	C.
April	18	....	13.4	797	C.
May	18	12	15.2	935	C.
June	15	....	11.1	660	C.
July	....	5	16.8	1,030	D.
August	....	....	[a] 5.0	307	C.
September	....	....	[a] 4.0	238	D.
The year	185	0	10.8	7,840	

[a] Estimated.

WILLOW CREEK NEAR MALHEUR, OREG.

LOCATION.—In sec. 6, T. 14 S., R. 41 E., about half a mile above the flow line of reservoir No. 3 of the Willow River Land & Irrigation Co., and about 2 miles south of Malheur, Malheur County.

DRAINAGE AREA.—Not measured.

RECORDS AVAILABLE.—March 27, 1912, to September 30, 1915. Records were also obtained in this vicinity November 20, 1904, to August 14, 1906, and March 19, 1910, to August 2, 1911.

Gage.—Barret & Lawrence water-stage recorder on left bank, referred to vertical staff on right bank. Gage reader, James Minonghan.

Discharge measurements.—Made by wading or from a bridge a short distance below gage.

Channel and control.—Stream flows in an artificial channel. Control shifts somewhat at high water.

Extremes of discharge.—Maximum stage during year, from water-stage recorder, 3.55 feet at 4 p. m. May 13 (discharge, 34 second-feet). Channel dry at times.

1904–1906 and 1910–1915: Maximum discharge (computed from cross section and estimated velocities), 1,400 second-feet March 20, 1910.

Winter flow.—Stage-discharge relation seriously affected by ice; flow estimated by observer.

Diversions.—About 5,000 acres of land are partly irrigated from Willow Creek above station; entire summer flow is diverted.

Accuracy.—Stage-discharge relation not permanent; affected by ice November 15 to February 13. Three poorly defined rating curves used, October 1 to November 14, February 14 to April 15, and April 20 to June 19. Mean daily gage heights obtained by inspecting recorder graph. Daily discharge ascertained by applying mean daily gage heights to ratings tables. Records poor.

Discharge measurements of Willow Creek near Malheur, Oreg., during the year ending Sept. 30. 1915.

Date.	Made by—	Gage height.	Discharge.	Date.	Made by—	Gage height.	Discharge.
		Feet.	*Sec. ft.*			*Feet.*	*Sec. ft.*
Mar. 12	C. G. Paulsen	2.73	13.3	Apr. 27	H. K. Donnelly	2.47	2.0
17	.....do	2.81	14.5	May 7	.....do	2.49	2.1
Apr. 8	H. K. Donnelly	2.52	5.6	July 10	.....do		[a] .5

[a] Estimated.

Daily discharge, in second feet, of Willow Creek near Malheur, Oreg., for the year ending Sept. 30, 1915.

Day.	Oct.	Nov.	Feb.	Mar.	Apr.	May.	June.
1	1.6	6.3		12	10	5.4	6.0
2	1.9	6.3		13	11	5.6	6.0
3	2.3	6.3		17	12	6.7	6.7
4	2.4	6.3		17	12	6.9	8.9
5	2.7	6.5		14	12	5.1	6.0
6	2.9	6.5		13	10	2.4	4.7
7	3.0	6.7		13	7.2	1.8	3.3
8	3.0	6.7		13	5.5	1.8	3.0
9	3.0	6.7		13	5.3	1.8	2.1
10	3.3	7.2		13	4.9	2.4	1.6
11	3.6	7.8		13	2.9	2.8	1.2
12	3.8	8.5		13	1.6	12	1.5
13	4.0	9.0	9.0	13	1.1	23	1.8
14	4.1	9.0	8.6	14	.8	20	1.8
15	4.3		8.6	17	.6	17	1.8
16	4.0		8.6	16	.5	13	1.4
17	4.4		11	15	.5	13	1.1
18	4.4		13	14	.5	14	.8
19	4.4		14	14	.5	13	.6
20	4.4		14	13	.9	12	
21	4.4		14	13	1.1	12	
22	5.9		14	13	2.5	17	
23	5.9		14	13	4.7	20	
24	5.6		13	13	6.0	19	
25	5.6		18	12	4.7	16	
26	5.6		24	11	2.5	12	
27	5.9		18	10	1.8	11	
28	5.9		12	12	2.5	12	
29	5.9			13	3.6	13	
30	6.1			12	6.7	11	
31	6.1			11		8	

Note.—Discharge estimated as follows: Nov. 15–30, 5 second-feet; Dec. 1–14, 4 second-feet; Dec. 15–31, 2.5 second-feet; Jan. 1–13, 4 second-feet; Jan. 14–31, 5 second-feet; Feb. 1–12, 11 second-feet; Apr. 16–19 0.5 second-foot; June 20–30, 0.4 second-foot. Discharge also interpolated for many single days. Practically no flow July to September.

Monthly discharge of Willow Creek near Malheur, Oreg., for the year ending Sept. 30, 1915.

Month.	Discharge in second-feet.			Run-off (total in acre-feet).	Accuracy.
	Maximum.	Minimum.	Mean.		
October	6.1	1.6	4.21	259	C.
November	9.0	....	5.99	356	C.
December	....	....	3.18	196	D.
January	....	....	4.42	272	D.
February	24	....	12.4	689	C.
March	17	10	13.3	818	B.
April	12	.5	4.53	270	C.
May	23	1.8	10.7	658	C.
June	8	....	2.13	127	D.
The period	....	....	....	3,640	

PAYETTE RIVER NEAR HORSESHOE BEND, IDAHO.

Location.—In sec. 14, T. 7 N., R. 2 E., 100 feet east of the tracks of the Idaho Northern branch of the Oregon Short Line Railroad, and 1½ miles northeast of Horseshoe Bend, Boise County.

Drainage area.—2,160 square miles at present site (measured on topographic and Land Office maps).

Records available.—May 3, 1912, to September 30, 1915, at present site; February 3, 1906, to November 22, 1912, at old site in sec. 2, 2 miles farther upstream. Two small creeks enter on left between the two stations.

Gage.—Barrett and Lawrence water-stage recorder on right bank about 200 feet above the railroad crossing; inclined staff on right bank at former site. S. H. McAllister, observer.

Discharge measurements.—Made from a cable about 200 feet below the gage.

Channel and control.—Bed consists of cobbles and coarse gravel with a few large rocks. Control practically permanent.

Extremes of discharge.—Maximum stage during year, from water-stage recorder, 5.76 feet at noon May 19 (discharge, 9,380 second-feet); minimum stage, 1.00 foot at 10 p. m. August 31, and 2 a. m. September 1 (discharge, 751 second-feet).

1906–1915: Maximum stage recorded, 11.5 feet (on original gage) June 7, 1909 (discharge, 19,500 second-feet); minimum stage recorded August 31 and September 1, 1915.

Winter flow.—Stage-discharge relation seriously affected by ice; flow estimated by comparison with Boise River records, and from weather records.

Diversions.—Only a few small ranch diversions are made above the station; record gives practically the total flow from the upper Payette basin.

Regulation.—None.

Accuracy.—State-discharge relation permanent; affected by ice December 16 to February 12. Rating curve well defined. Mean daily gage heights obtained by inspecting recorder graph. Daily discharge ascertained by applying daily gage heights to rating table. Open-water records excellent, winter records fair.

Cooperation.—Gage-height record furnished by the Electric Investment Co.

Discharge measurements of Payette River near Horseshoe Bend, Idaho, during the year ending Sept. 30, 1915.

[Made by G. C. Baldwin.]

Date.	Gage height.	Discharge.
	Feet.	*Sec.-ft.*
June 8	4.20	5,450
Sept. 3	1.22	914

Daily discharge, in second-feet, of Payette River near Horseshoe Bend, Idaho, for the year ending Sept. 30, 1915.

Day.	Oct.	Nov.	Dec.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.
1	950	1,320	959	....	1,050	2,680	5,580	7,970	2,600	1,310	770
2	958	1,340	848	....	1,050	2,680	5,280	8,220	2,450	1,310	936
3	1,090	1,340	1,010	....	1,060	2,930	4,980	7,720	2,300	1,240	906
4	1,120	1,330	1,120	....	1,060	3,110	4,680	7,240	2,150	1,190	862
5	1,100	1,320	1,070	....	1,080	3,200	4,470	6,520	2,080	1,150	842
6	1,060	1,310	1,030	....	1,030	3,110	4,160	6,280	2,220	1,120	808
7	1,060	1,280	950	....	1,020	3,110	3,860	6,050	2,450	1,120	795
8	1,060	1,250	848	....	998	3,020	3,760	5,810	2,600	1,110	789
9	1,050	1,240	814	....	998	2,930	3,760	5,700	2,600	1,060	782
10	1,040	1,240	808	....	1,020	2,930	4,470	5,470	2,680	1,060	789
11	1,100	1,220	890	....	1,030	2,930	5,120	5,240	2,450	1,030	789
12	1,120	1,240	982	....	1,050	3,110	6,050	5,010	2,300	1,010	814
13	1,110	1,260	898	958	1,060	3,290	6,520	4,790	2,150	1,010	862
14	1,090	1,290	814	936	1,100	4,060	7,000	4,470	2,010	998	890
15	1,070	1,230	782	906	1,120	4,680	7,000	4,260	1,950	990	876
16	1,060	1,040	....	920	1,170	4,580	6,760	4,060	1,880	974	862
17	1,070	1,060	....	958	1,230	4,580	7,000	3,960	1,820	958	848
18	1,300	1,120	....	958	1,300	4,680	8,220	3,860	1,760	943	828
19	1,420	1,080	....	1,120	1,370	5,010	9,220	3,860	1,700	906	814
20	1,640	1,040	....	1,120	1,380	5,120	8,970	3,760	1,610	890	814
21	1,640	1,060	....	1,120	1,470	5,470	8,720	3,660	1,520	883	808
22	1.600	1,010	....	1,120	1,610	5,470	8,470	3,470	1,510	869	801
23	1,510	1,090	....	1,100	1,880	5,350	8,220	3,380	1,470	862	789
24	1,420	1,210	....	1,080	2,080	5,120	7,970	3,290	1,420	869	789
25	1,380	1,170	....	1,090	2,370	4,900	7,720	3,290	1,400	855	789
26	1,340	1,120	....	1,100	2,370	4,580	7,480	3,380	1,330	842	782
27	1,320	1,080	....	1,090	2,220	4,580	7,000	3,200	1,330	828	898
28	1,300	1,120	....	1,060	2,220	4,680	7,000	2,930	1,310	808	876
29	1,290	1,210	....	....	2,450	4,900	7,480	2,850	1,290	801	848
30	1,280	1,070	....	....	2,850	5,350	7,480	2,680	1,260	795	828
31	1,300	....	....	....	2,760	....	7,480	....	1,290	770	....

NOTE.—Discharge estimated, because of ice, from weather records and by comparison with records of flow of Boise River as follows: Dec. 16–31, 800 second-feet; Jan. 1–31, 950 second-feet; Feb. 1–12, 1,000 second-feet. Discharge interpolated Dec. 1, May 2, 3, July 2 and 3 for lack of gage heights.

Monthly discharge of Payette River near Horseshoe Bend, Idaho, for the year ending Sept. 30, 1915.

[Drainage area, 2,160 square miles.]

Month.	Discharge in second-feet.				Run-off.		Accuracy.
	Maximum.	Minimum.	Mean.	Per square mile.	Depth in inches on drainage area.	Total in acre-feet.	
October	1,640	950	1,220	0.565	0.651	75,000	A.
November	1,340	1,010	1,190	.551	.615	70,800	A.
December	1,120	....	859	.398	.459	52,800	C.
January	....	....	950	.440	.507	58,400	D.
February	1,120	....	1,020	.472	.492	56,600	B.
March	2,850	998	1,500	.694	.800	92,200	A.
April	5,470	2,680	4,070	1.88	2.10	242,000	A.
May	9,220	3,760	6,510	3.01	3.47	400,000	A.
June	8,220	2,680	4,750	2.20	2.46	283,000	A.
July	2,680	1,260	1,900	.880	1.01	117,000	A.
August	1,310	770	986	.456	.526	60,600	A.
September	936	770	829	.384	.428	49,300	A.
The year	9,220	770	2,150	.995	13.5	1,560,000	

NOTE.—See foot note to table of daily discharge.

NORTH FORK OF PAYETTE RIVER AT LARDO, IDAHO.

Location.—In sec. 8, T. 18 N., R. 3 E., about one-fourth mile below Lardo, Boise County, and the outlet of Big Payette Lake. No tributaries enter between the lake and the gage.

Drainage area.—131 square miles (measured on topographic and Land Office maps).

Records available.—September 1, 1908, to September 30, 1915.

Gage.—Inclined staff on left bank installed July 25, 1911; read daily by Neal Boydstun. Original temporary gage (used Sept. 1 to Oct. 8, 1908) was about 1 mile below site of present gage; permanent vertical staff gage (used until July 25, 1911) was installed October 14, 1908, on left bank about 30 feet below present site. Gage datum unchanged since October 14, 1908.

Discharge measurements.—Made by wading or from cable one-half mile below gage.

Channel and control.—Bed of stream and control consists of cobbles and gravel; slightly shifting.

Extremes of discharge.—Maximum stage recorded during year, 4.8 feet at 7.30 a. m. May 23 (discharge, 1,300 second-feet); minimum stage recorded, 1.55 feet September 25 to 30 (discharge, 19 second-feet).

1908–1915: Maximum stage recorded, 7.5 feet June 5, 1909 (discharge, 4,250 second-feet); minimum stage recorded 1.1 feet October 21 and 22, 1911 (discharge 3 second-feet).

Winter flow.—Stage-discharge relation not affected by ice, presumably because of the proximity of the station to Big Payette Lake.

Diversions.—None above station.

Regulation.—None.

Accuracy.—Stage-discharge relation changed during April, 1915; not affected by ice. Two well-defined rating curves used, October 1 to April 3 and April 9 to September 30. Gage read to quarter-tenths once daily. Daily discharge ascertained by applying daily gage heights to rating table. Records excellent.

Discharge measurements of North Fork of Payette River at Lardo, Idaho, during the year ending Sept. 30, 1915.

[Made by G. C. Baldwin.]

Date.	Gage height.	Discharge.
	Feet.	*Sec.-ft.*
June 13	3.72	568
Sept. 9	1.79	31.6
9	1.79	31.8

Daily discharge, in second-feet, of North Fork of Payette River at Lardo, Idaho, for the year ending Sept. 30, 1915.

Day.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.
1	45	153	120	68	68	73	121	1,150	1,150	271	108	62
2	47	158	126	68	68	70	124	1,040	1,070	271	105	66
3	47	166	126	68	68	70	128	893	1,040	271	105	70
4	47	173	126	68	72	70	130	794	999	271	100	64
5	50	178	120	65	72	70	143	670	963	254	100	62
6	50	192	120	65	72	68	165	613	928	254	100	58
7	52	178	120	65	72	68	178	641	893	251	95	53
8	52	173	114	65	72	68	190	762	826	251	92	44
9	52	173	114	65	72	68	203	826	794	240	92	37
10	52	166	110	65	72	68	218	860	731	234	88	41
11	52	166	110	68	68	68	234	928	670	218	84	39
12	52	158	93	68	68	68	251	963	641	209	84	37
13	54	153	88	72	68	68	308	1,040	585	209	80	35
14	54	153	83	72	68	68	369	1,070	585	203	80	34
15	56	148	78	72	72	70	482	1,070	558	189	77	32
16	60	148	78	72	72	70	532	999	532	176	74	30
17	63	142	78	72	72	70	585	963	507	170	74	28
18	65	142	78	72	72	70	670	999	482	156	70	27
19	68	135	75	68	72	73	762	1,040	458	146	70	26
20	72	135	75	68	72	73	860	1,070	435	132	66	24
21	75	130	75	68	72	73	963	1,150	412	124	64	22
22	78	130	75	68	72	73	1,040	1,220	390	118	64	22
23	86	130	72	65	72	77	1,070	1,300	390	118	62	22
24	93	110	72	65	72	77	1,070	1,220	369	112	58	20
25	102	114	72	65	72	77	1,070	1,150	348	124	58	19
26	107	114	68	65	73	84	1,070	1,070	328	118	55	19
27	110	114	68	65	73	92	1,070	963	308	118	53	19
28	120	114	68	65	73	100	1,070	1,070	308	118	53	19
29	126	120	68	65	....	108	1,150	1,220	290	112	58	19
30	135	120	68	65	....	114	1,150	1,220	290	112	58	19
31	148	....	68	65	....	118	....	1,150	....	108	62	....

NOTE.—Discharge interpolated Dec. 13, 14, Apr. 1, 2, and 4–8, for lack of gage-height record.

Monthly discharge of North Fork of Payette River at Lardo, Idaho, for the year ending Sept. 30, 1915.

[Drainage area, 131 square miles.]

Month.	Discharge in second-feet.				Run-off.		Accuracy.
	Maximum.	Minimum.	Mean.	Per square mile.	Depth in inches on drainage area.	Total in acre-feet.	
October	148	45	73.2	0.559	0.644	4,500	A.
November	192	110	146	1.11	1.24	8,690	A.
December	126	68	90.5	.691	.797	5,560	A.
January	72	65	67.3	.514	.593	4,140	A.
February	73	68	71.1	.543	.565	3,950	A.
March	118	68	76.7	.585	.674	4,720	A.
April	1,150	121	579	4.42	4.93	34,500	B.
May	1,300	613	1,000	7.63	8.80	61,500	A.
June	1,150	290	609	4.65	5.19	36,200	A.
July	271	108	183	1.40	1.61	11,300	A.
August	108	53	77.1	.589	.679	4,740	B.
September	70	19	35.6	.272	.304	2,120	B.
The year	1,300	19	252	1.92	26.0	182,000	

NORTH FORK OF PAYETTE RIVER AT VAN WYCK, IDAHO.

Location.—In sec. 26, T. 14 N., R. 3 E., at the river bridge half a mile north of Van Wyck, Boise County, and 1½ miles west of Crawford. Willow Creek, a small stream, enters from the south half a mile below.

Drainage area.—586 square miles (measured on topographic and Land Office maps)

Records available.—January 1, 1912, to September 30, 1915. Gage heights January 1 to August 7, 1912, were derived from private records from comparative gage readings; daily discharge not determined prior to June 20, 1912.

Gage.—Vertical staff spiked to the downstream side of the second pier from right end of bridge; read by L. S. Kimball. Gage used August 8, 1912, to May 4, 1913, was vertical staff at same location and reading 0.6 foot higher than present gage.

Discharge measurements.—Made from bridge or by wading.

Channel and control.—Bed consists of rock overlain by sand and gravel; control somewhat shifting.

Extremes of discharge.—Maximum stage recorded during year, 5.8 feet May 21 and 22 (discharge, 3,900 second-feet); minimum stage recorded, 1.6 feet August 31 and September 10 to 12 (discharge, 139 second-feet).

1912-1915: Maximum stage recorded 9.1 feet June 1 and 2, 1913 (discharge, 8,140 second-feet); minimum stage recorded 1.6 feet August 31 and September 10 to 12, 1915 (discharge, 139 second-feet).

Winter flow.—Stage-discharge relation seriously affected by ice; flow estimated from observer's notes, weather records, and by comparison with the records at other stations in the Payette and Boise drainages.

Diversions.—Practically no diversions made above station.

Regulation.—None.

Accuracy.—Stage-discharge relation changed during winter; affected by ice December 1 to March 24. Two fairly well defined rating curves used, one October 1 to November 30, the other March 25 to September 30. Gage read to half-tenths once daily; gage heights somewhat uncertain during low stages. Daily discharge ascertained by applying daily gage heights to rating tables, except during period for which stage-discharge relation was affected by ice. Records good April to July; fair for October, November, August, and September; poor for winter months.

Cooperation.—Gage-height record furnished by L. S. Kimball.

Discharge measurements of North Fork of Payette River at Van Wyck, Idaho, during the year ending Sept. 30, 1915.

[Made by G. C. Baldwin.]

Date.	Gage height.	Discharge.
	Feet.	*Sec.-ft.*
June 14	3.82	1,440
Sept. 10	1.60	139

Daily discharge, in second-feet, of North Fork of Payette River at Van Wyck, Idaho, for the year ending Sept. 30, 1915.

Day.	Oct.	Nov.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.
1	316	457	....	775	2,060	2,910	711	295	175
2	298	457	....	775	2,060	2,780	650	296	194
3	298	457	....	775	2,060	2,650	592	295	194
4	298	457	....	841	2,060	2,650	592	295	194
5	298	457	....	841	1,950	2,400	564	295	175
6	298	436	....	841	1,840	2,290	536	295	175
7	298	436	....	909	1,640	2,170	483	274	175
8	298	436	....	909	1,550	2,060	483	274	175
9	298	457	....	979	1,550	1,840	433	274	157
10	298	457	....	979	1,640	1,740	433	274	139
11	298	436	....	1,050	2,060	1,740	433	274	139
12	298	436	....	1,050	2,400	1,640	433	274	139
13	298	436	....	1,050	2,650	1,550	433	253	175
14	281	436	....	1,130	2,650	1,460	433	253	175
15	281	414	....	1,130	2,650	1,460	385	253	175
16	281	414	....	1,130	2,780	1,370	385	253	175
17	264	414	....	1,210	3,040	1,370	385	253	194
18	264	414	....	1,290	3,180	1,290	385	253	194
19	264	414	....	1,290	3,460	1,290	362	253	194
20	264	414	....	1,370	3,600	1,290	362	233	194
21	264	414	....	1,550	3,900	1,210	362	233	175
22	298	414	....	1,640	3,900	1,290	339	233	175
23	298	414	....	1,740	3,600	1,210	339	233	175
24	334	414	....	1,840	3,320	1,130	339	194	194
25	373	414	711	1,740	3,180	1,130	339	194	194
26	414	373	711	1,740	3,180	1,050	339	194	194
27	457	373	711	1,740	3,040	979	339	194	194
28	457	373	711	1,740	2,910	909	339	175	175
29	457	373	711	1,840	2,780	841	339	175	175
30	457	373	775	1,950	2,910	775	317	175	157
31	457	....	775	....	3,040	....	317	139	....

NOTE.—Discharge estimated, because of ice, from weather records and by comparison with records of flow at other stations as follows: Dec. 1–31, 260 second-feet; Jan. 1–31, 285 second-feet; Feb 1–28, 320 second feet; Mar. 1–24, 400 second-feet.

Monthly discharge of North Fork of Payette River at Van Wyck, Idaho, for the year ending Sept. 30, 1915.

[Drainage area, 586 square miles.]

Month.	Discharge in second-feet.				Run-off.		Accuracy.
	Maximum.	Minimum.	Mean.	Per square mile.	Depth in inches on drainage area.	Total in acre-feet.	
October	457	264	324	0.553	.638	19,900	C.
November	457	373	422	.720	.803	25,100	C.
December	....	....	260	.444	.512	16,000	D.
January	....	....	285	.486	.560	17,500	D.
February	....	....	320	.546	.569	17,800	D.
March	775	....	474	.809	.933	29,100	D.
April	1,950	775	1,260	2.15	2.40	75,000	B.
May	3,900	1,550	2,670	4.56	5.26	164,000	B.
June	2,910	775	1,620	2.76	3.08	96,400	B.
July	711	317	425	.725	.836	26,100	B.
August	295	139	244	.416	.480	15,000	C.
September	194	139	177	.302	.337	10,500	C.
The year	3,900	139	708	1.21	16.4	512,000	

NOTE.—See footnote to table of daily discharge.

LAKE FORK OF PAYETTE RIVER NEAR McCALL, IDAHO.

Location.—In sec. 13, T. 18 N., R. 3 E., at the Waine ranch, one-fourth mile below outlet of Little Payette Lake and 3 miles east of McCall, Boise County. No tributaries between lake and gage.

Drainage area.—Not measured.

Records available.—September 28, 1909, to October 17, 1914, when station was discontinued.

Gage.—Vertical staff on left bank; installed November 4, 1910, replacing original vertical staff at the same site and datum; read by Arne S. Maki.

Discharge measurements.—Made by wading or from cable about 200 feet below gage.

Channel and control.—Bed composed of fine gravel. Control is a rough diversion dam about one-fourth mile below gage.

Extremes of discharge.—Maximum stage recorded October 1-17, 1.35 feet October 4 (discharge, 52 second-feet); minimum stage recorded, 1.0 foot October 13 (discharge, 28 second feet).

1909-1914: Maximum stage recorded 6.1 feet May 28, 1913 (discharge, 1,900 second-feet); minimum stage recorded 0.30 foot September 30, 1911 (discharge, 5 second-feet).

Winter flow.—Stage-discharge relation unaffected by ice.

Diversions.—None above station.

Regulation.—None.

Accuracy.—Daily discharge ascertained by applying gage heights to well-defined rating curve. Records good.

Daily discharge, in second-feet, of Lake Fork of Payette River near McCall, Idaho, for the month of October, 1914.

Day.	Oct.	Day.	Oct.	Day.	Oct.
1	38	11	34	21	
2	38	12	38	22	
3	34	13	28	23	
4	52	14	34	24	
5	48	15	34	25	
6	41	16	34	26	
7	44	17	38	27	
8	41	18		28	
9	34	19		29	
10	34	20		30	
				31	

WEISER RIVER NEAR WEISER, IDAHO.

Location.—In sec. 25, T. 11 N., R. 4 W., 2 miles below mouth of Crane Creek, 5 miles above Mann Creek, and 10 miles above Weiser, Washington County, at about the same site as station discontinued in 1904.

Drainage area.—Not measured.

Records available.—December 6, 1894, to December 31, 1904; October 7, 1910, to December 31, 1914, when station was discontinued.

Gage.—Inclined staff on right bank beside the Pacific and Idaho Northern Railroad track; installed December 12, 1911, and used since January 1, 1912; read by J. R. Derig. Records in 1910 and 1911 are referred to an inclined staff on right bank about 1 mile below present site; no known relation between datum of present gage and that of gages used previously.

Discharge measurements.—Made by wading or from cable at site of old gage 1 mile downstream.

Channel and control.—Bed composed of rock and coarse gravel. Control practically permanent. One channel at all stages. Banks high, clean, and not subject to overflow.

Extremes of discharge.—Maximum stage recorded October 1 to December 31, 1914, 5.4 feet November 17 (discharge, 450 second-feet); minimum stage recorded 4.6 feet November 28 (discharge, 61 second-feet).

1894–1914: Maximum stage recorded 9.20 feet May 5, 1896 (discharge, 17,900 second-feet); minimum stage recorded 0.20 foot, August 21, 1898 (discharge, 10 second-feet).

Winter flow.—Stage-discharge relation not seriously affected by ice.

Diversions.—Some small diversions are made from the main river above the station. Large diversions are made from storage reservoirs on Lost and Crane creeks.

Regulation.—None.

Accuracy.—Gage read to hundredths daily. Rating curve well defined. Records good.

Daily discharge, in second-feet, of Weiser River near Weiser, Idaho, for the period October to December, 1914.

Day.	Oct.	Nov.	Dec.	Day.	Oct.	Nov.	Dec	Day.	Oct.	Nov.	Dec
1	258	206	160	11	179	197	206	21	316	316	120
2	258	197	160	12	152	183	206	22	287	266	120
3	248	202	183	13	140	197	190	23	270	216	120
4	206	206	197	14	140	206	175	24	258	206	120
5	206	206	232	15	128	160	160	25	140	206	120
6	248	206	232	16	120	183	160	26	128	211	120
7	206	206	232	17	120	450	160	27	128	216	104
8	140	206	232	18	206	405	146	28	120	61	87
9	152	206	216	19	248	360	133	29	120	110	87
10	206	206	216	20	316	316	120	30	120	160	87
								31	206	......	87

Note.—Discharge determined from a well-defined rating curve except as follows: Estimated Nov. 21, on account of apparent effect of ice; interpolated, for lack of gage heights, Oct. 11, Nov. 2, 18, 19, 22, 26, 29, Dec. 6, 13, 14, 18, 19, 22, 25, 27, 29, and 31.

Monthly discharge of Weiser River near Weiser, Idaho, for the period October to December, 1914.

Month.	Discharge in second-feet.			Run-off (total in acre-feet).	Accuracy.
	Maximum.	Minimum.	Mean.		
October	316	120	193	11,900	B.
November	450	61	222	13,200	B.
December	232	87	158	9,720	C.
The period	....	....	....	34,800	

CRANE CREEK NEAR MIDVALE, IDAHO.

Location.—In sec. 19, T. 12 N., R. 2 W., 300 feet below dam of Crane Creek Irrigation Co., and 12 miles southeast of Midvale, Washington County. No tributaries between dam and station; Last Chance Creek enters a short distance below.

Drainage area.—269 square miles (measured on topographic maps).

Records available.—October 30, 1910, to September 30, 1915.

Gage.—Staff on right bank in three vertical sections and one inclined section; read by Gilbert Thornton, gate keeper at the dam.

Discharge measurements.—Made by wading or from a cable 20 feet above gage.

Channel and control.—Bed composed of lava rocks and coarse gravel; very rough. Control practically permanent. Banks very brushy.

Extremes of discharge.—Maximum stage recorded during year, 4.9 feet May 19–29 (discharge, 629 second-feet); gates at dam closed January 1 to April 17, and discharge during this period assumed as zero.

1910–1915: Maximum stage recorded, 8.9 feet December 3, 1910 (discharge, 4,240 second-feet). Zero flow reported at various times when gates at dam were closed.

Winter flow.—Stage-discharge relation not affected by ice; open water rating curve assumed applicable in December. The comparative freedom from ice at this station is probably due to the proximity of the station to the reservoir.

Diversions.—No large diversions above the gage. Flood waters are impounded in the storage reservoir of the Crane Creek Irrigation Co. just above the gage. The record of flow at the station shows only the amount of water discharged from the reservoir and does not necessarily represent the true flow of Crane Creek.

Regulation.—Flow completely regulated by gates at dam. When the gates are closed the flow has been considered as zero, but there may be some slight seepage which is thus unaccounted for.

Accuracy.—Stage-discharge relation practically permanent; not affected by ice. Rating curve fairly well defined. Gage read to tenths once daily. Gage height record fair. Daily discharge ascertained by applying daily gage heights to rating table. Records fair.

Discharge measurements of Crane Creek near Midvale, Idaho, during the year ending Sept. 30, 1915.

[Made by A. W. Harrington.]

Date.	Gage height.	Discharge.
	Feet.	*Sec.-ft.*
Sept. 2	2.67	53.2
2	2.20	16.9

Daily discharge, in second-feet, of Crane Creek near Midvale, Idaho, for the year ending Sept. 30, 1915.

Day.	Oct.	Nov.	Dec.	Apr.	May.	June.	July.	Aug.	Sept.
1	24	37	37	....	30	30	108	53	....
2	24	37	37	....	30	30	108	53	45
3	24	37	37	....	30	30	108	53	....
4	37	37	37	....	30	30	108	53	....
5	37	37	37	....	16	30	108	53	....
6	37	37	37	....	6	30	108	53	....
7	37	37	37	....	6	30	83	53	....
8	37	37	37	....	6	30	83	53	....
9	37	37	37	....	6	72	83	53	9
10	37	37	37	....	6	72	83	53	....
11	37	37	37	....	6	72	83	53	....
12	37	37	37	....	6	72	83	53	....
13	37	37	37	....	6	83	83	53	....
14	37	37	37	....	6	83	83	53	45
15	37	37	37	....	6	83	53	53	....
16	37	37	37	....	6	83	53	53	6
17	37	37	37	....	6	83	53	53	6
18	37	37	37	1	89	83	53	53	6
19	37	37	37	2	629	83	53	53	6
20	37	37	37	30	629	83	53	53	6
21	37	37	37	30	629	83	53	53	6
22	37	37	37	30	629	108	53	....	6
23	37	37	37	30	629	108	53	....	6
24	37	37	37	30	629	108	53	....	6
25	37	37	37	30	629	108	37	....	6
26	37	37	37	30	629	108	37	....	6
27	37	37	37	30	629	108	37	....	6
28	37	37	37	30	629	108	37	....	6
29	37	37	37	30	629	108	37	....	6
30	37	37	37	30	30	108	37	....	6
31	37	....	37	....	30	....	37	....	

Note.—Gates at dam were closed Jan. 1 to April 17; discharge assumed as zero although there may have been some seepage. Discharge interpolated Oct. 1–3, Sept. 17, 18, 20, 21, and 23–30. Discharge estimated as follows: Aug. 22 to Sept. 1, 53 second-feet; Sept. 3–8, 30 second-feet; Sept. 10–13 and 15, 45 second-feet.

Monthly discharge of Crane Creek near Midvale, Idaho, for the year ending Sept. 30, 1915.

Month.	Discharge in second-feet.			Run-off (total in acre-feet).	Accuracy.
	Maximum.	Minimum.	Mean.		
October	37	24	35.7	2,200	C.
November	37	37	37.0	2,200	C.
December	37	37	37.0	2,280	C.
January	0	0	0.0	0	
February	0	0	0.0	0	
March	0	0	0.0	0	
April	30	0	11.1	660	D.
May	629	6	235	14,400	B.
June	108	30	74.9	4,460	B.
July	108	37	67.8	4,170	B.
August	53	53	53.0	3,260	C.
September	....	6	21.6	1,290	D.
The year	629	0	48.3	34,900	

NOTE.—See footnote to table of daily discharge.

NORTH FORK OF BURNT RIVER AT AUDREY, OREG.

LOCATION.—In sec. 31, T. 11 S., R. 37 E., at Audrey post office, Baker County, one-fourth mile below mouth of China Creek, and 9 miles south of Whitney, Baker County.

DRAINAGE AREA.—Not measured.

RECORDS AVAILABLE.—March 15 to September 30, 1915.

GAGE.—Vertical staff nailed to large willow tree on right bank, 200 feet below the post office; read by Charles Davidson.

DISCHARGE MEASUREMENTS.—Made from foot log at gage or by wading.

CHANNEL AND CONTROL.—Gravel; shifting only in floods. Banks may be cut during high water.

EXTREMES OF DISCHARGE.—Maximum stage recorded, 2.70 feet March 29 (discharge, 460 second-feet); minimum stage recorded, 0.02 foot August 21–22 (discharge, 0.3 second-foot).

WINTER FLOW.—Stage-discharge relation affected by ice two or three months.

DIVERSIONS.—An area of 910 acres is irrigated from North Fork above the station, and two ditches take water out about a mile above the station, one diverting around the gage.

ACCURACY.—Stage-discharge relation practically permanent. Rating curve fairly well defined below 200 second-feet; not defined above. Gage read to quarter-tenths once daily. Daily discharge ascertained by applying daily gage heights to rating table. Records good except for low water, for which they are fair.

COOPERATION.—Field data furnished by the State Engineer of Oregon.

Discharge measurements of North Fork of Burnt River at Audrey, Oreg., during the year ending Sept. 30, 1915.

Date.	Made by—	Gage height.	Discharge.	Date.	Made by—	Gage height.	Discharge.
		Feet.	*Sec.-ft.*			*Feet.*	*Sec.-ft.*
Mar. 15	C. G. Paulsen	[a] 1.02	36.7	June 17	H. K. Donnelly	0.35	8.2
Apr. 16	H. K. Donnelly	1.20	108	July 6	.....do	.18	3.7
27	.....do	.70	26.8	Aug. 20	.....do	.05	.3
May 27	.....do	.80	30.1				

[a] Stage-discharge relation affected by ice.

Daily discharge, in second feet of North Fork of Burnt River at Audrey, Oreg., for the year ending Sept. 30, 1915.

Day.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.
1	....	164	50	35	3.0	2.5	1.2
2	....	164	66	35	3.0	1.5	1.2
3	....	208	50	33	3.0	1.5	1.2
4	....	208	50	33	3.0	1.5	1.2
5	....	164	50	33	3.0	1.5	.8
6	....	143	47	25	3.0	1.2	.8
7	....	112	35	15	3.0	1.2	.8
8	....	81	35	10	3.5	1.2	.8
9	....	81	35	10	10	1.2	.8
10	....	81	35	10	10	1.2	1.5
11	....	81	50	10	6.5	1.2	1.5
12	....	81	63	10	3.5	1.2	1.5
13	....	81	63	10	3.5	1.2	1.5
14	....	81	100	10	3.5	1.2	3.0
15	40	81	68	10	6.0	1.5	3.0
16	55	85	81	10	6.0	1.5	3.0
17	66	81	70	9	6.5	1.5	3.0
18	81	81	70	9	6.5	1.5	3.0
19	100	81	70	9	6.0	1.5	3.0
20	104	81	63	6.5	3.5	1.5	3.0
21	104	66	50	6.5	3.5	.3	3.0
22	123	66	66	6.5	3.5	.3	3.0
23	139	50	63	7.0	3.5	.8	3.0
24	164	47	50	6.0	3.5	.8	3.0
25	123	47	50	6.5	3.5	.8	3.0
26	100	35	47	7.0	3.5	.8	3.0
27	104	26	47	3.5	3.0	.8	3.0
28	143	25	47	3.0	3.0	.8	3.0
29	460	46	50	3.0	3.5	1.2	3.0
30	230	66	50	3.0	3.5	1.2	3.0
31	197	....	35	....	3.0	1.2	....

NOTE.—Discharge Mar. 15–16 estimated because of ice.

Monthly discharge of North Fork Burnt of River near Audrey, Oreg., for the year ending Sept. 30, 1915.

Month.	Discharge in second-feet.			Run-off (total in acre-feet).	Accuracy.
	Maximum.	Minimum.	Mean.		
March 15–31	460	40	137	4,620	B.
April	208	25	89.8	5,340	B.
May	100	35	55.0	3,380	A.
June	35	3.0	12.8	762	A.
July	10	3.0	4.29	264	B.
August	2.5	.3	1.20	74	C.
September	3.0	.8	2.19	130	C.
The period	....	....	....	14,600	

BURNT RIVER NEAR HEREFORD, OREG.

LOCATION.—In sec. 25, T. 12 S., R. 36 E., about one-fourth mile below mouth of canyon which separates valley around Hereford from that around Unity, 3 miles below junction of North and South forks, and 5½ miles west of Hereford, Baker County.

DRAINAGE AREA.—Not measured.

RECORDS AVAILABLE.—March 16 to September 30, 1915.

GAGE.—Vertical staff on left bank; observer, T. B. Van Cleave.

DISCHARGE MEASUREMENTS.—Made by wading or from planks about one-fourth mile above gage during high water.

Channel and control.—Gravel; fairly permanent. Banks subject to overflow below gage and above control in extremely high water.

Extremes of discharge.—Maximum stage recorded, 3.25 feet March 29 (discharge, 353 second-feet); minimum stage recorded, —0.05 foot August 24 (discharge, 2.5 second-feet).

Winter flow.—No record for period when stream was frozen.

Diversions.—A total area of 7,000 acres is irrigated from the forks of Burnt River above the station.

Regulation.—None.

Accuracy.—Stage-discharge relation practically permanent. Rating curve well defined between 2 and 125 second-feet. Gage read twice daily. Daily discharge ascertained by applying mean daily gage heights to rating table. Records good for medium stages; fair for high and low water.

Cooperation.—Field data furnished by State engineer of Oregon.

Discharge measurements of Burnt River near Hereford, Oreg., during the year ending Sept. 30, 1915.

Date.	Made by—	Gage height.	Discharge.	Date.	Made by—	Gage height.	Discharge.
		Feet.	*Sec-ft.*			*Feet.*	*Sec.-ft.*
Mar. 16	C. G. Paulsen	1.20	76.4	June 23	H. K. Donnelly	.30	8.9
Apr. 12	H. K. Donnelly	1.35	96.7	July 6	.....do	.12	8.6
27	.....do	.58	20.1	Aug. 24	.....do	—.05	2.5
June 5	.....do	.80	38.9				

Daily discharge, in second-feet, of Burnt River near Hereford, Oreg., for the year ending Sept. 30, 1915.

Day.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.
1		181	41	43	6	5	5
2		184	46	43	7	5	5
3		233	43	36	7	5	5
4		226	36	35	5	7	5
5		188	36	31	6	6	5
6		174	30	18	5		5
7		154	30	18	7		5
8		134	28	14	8		6
9		124	28	12	18		7
10		102	30	14	18		6
11		92	40	12	13		6
12		94	51	17	11		7
13		87	64	16	8		7
14		92	95	12	7		8
15		77	82	11	7		7
16	76	71	75	10	7		7
17	86	62	71	9	7		8
18	97	55	68	8	8		8
19	96	56	66	7	7		7
20	104	46	55	6	7		7
21	118	45	55	8	7		7
22	149	41	55	9	7		7
23	167	36	56	7	7		7
24	184	36	65	5	6		6
25	151	30	62	5	5		7
26	123	25	51	6	5		7
27	108	22	45	7	5		7
28	135	18	49	7	5		8
29	300	23	55	7	5		8
30	270	60	40	5	5		7
31	203		36		22		

Note.—Discharge for Aug. 6–31 estimated 3 second-feet because of inaccurate gage readings.

Monthly discharge of Burnt River near Hereford, Oreg., for the year ending Sept. 30, 1915.

Month.	Discharge in second-feet.			Run-off (total in acre-feet).	Accuracy.
	Maximum.	Minimum.	Mean.		
March 16-31	300	76	148	4,700	B.
April	233	18	92.3	5,490	B.
May	95	28	51.1	3,140	A.
June	43	5	14.6	869	B.
July	22	5	8.0	492	B.
August	7	....	3.4	209	C.
September	8	5	6.6	393	B.
The period	....	....	....	15,300	

BURNT RIVER AT BRIDGEPORT, OREG.

LOCATION.—In sec. 25, T. 12 S., R. 41 E., at highway bridge, about 250 yards north of Bridgeport post office, Baker County, above Auburn and Clarks creeks.

DRAINAGE AREA.—Not measured.

RECORDS AVAILABLE.—March 11 to September 30, 1915.

GAGE.—Vertical staff on left bank, 30 feet above highway bridge. Charles Wendt, observer.

DISCHARGE MEASUREMENTS.—Made from bridge or by wading.

CHANNEL AND CONTROL.—Gravel; probably shifting in floods.

EXTREMES OF DISCHARGE.—Maximum stage recorded, 4.45 feet March 31 (discharge, 318 second-feet); minimum stage, 1.18 feet September 18-22, 24, and 25 (discharge, 0.9 second-foot).

WINTER FLOW.—No records for periods during which stream was frozen.

DIVERSIONS.—14,600 acres are irrigated above the canyon, the entrance of which lies about 2 miles below the station.

REGULATION.—None.

ACCURACY.—Stage-discharge relation practically permanent. Rating curve well defined below 150 second-feet. Gage read to quarter-tenths once daily and twice daily during floods. Daily discharge ascertained by applying daily gage heights to rating table. Records good except for extremely low stages, for which they are fair.

COOPERATION.—Field data furnished by State engineer of Oregon.

Discharge measurements of Burnt River at Bridgeport, Oreg., during the year ending Sept. 30, 1915.

Date.	Made by—	Gage height.	Discharge.	Date.	Made by—	Gage height.	Discharge.
		Feet.	*Sec.-ft.*			*Feet.*	*Sec.-ft.*
Mar. 11	C. G. Paulsen	2.49	71.7	June 1	H. K. Donnelly	2.40	57.4
18	.....do	2.95	111	18	.....do	1.40	4.1
Apr. 12	H. K. Donnelly	2.60	73.7	July 10	.....do	1.32	2.5
May 6	.....do	1.80	16.8	Aug. 21	.....do	1.20	1.0

Daily discharge, in second-feet, of Burnt River at Bridgeport, Oreg., for the year ending Sept. 30, 1915.

Day.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.
1	....	248	25	117	2.5	2.2	1.0
2	....	234	22	48	2.5	2.2	1.0
3	....	220	17	43	2.5	2.5	1.0
4	....	278	17	42	2.5	2.5	1.0
5	....	262	17	42	2.5	1.8	1.0
6	....	234	17	22	2.8	1.8	1.0
7	....	199	17	17	2.8	1.8	1.0
8	....	178	16	11	3.2	1.8	1.0
9	....	140	17	9	3.2	1.8	1.0
10	....	117	17	9	3.2	1.8	1.0
11	66	106	22	5.6	2.5	1.8	1.0
12	70	66	22	6	2.5	1.8	1.0
13	75	62	85	5	2.5	1.3	1.0
14	80	58	117	6	2.5	1.3	1.0
15	90	58	119	6	2.5	1.3	1.0
16	100	35	122	6	2.5	1.3	1.0
17	100	28	108	4	2.5	1.0	1.0
18	112	25	106	5	2.5	1.0	.9
19	117	22	104	4	2.5	1.0	.9
20	117	22	95	4	2.5	1.0	.9
21	128	9	93	4	2.5	1.0	9
22	138	9	85	4	2.5	1.0	.9
23	152	6	85	4	2.2	1.0	1.0
24	152	6	85	3.7	2.2	1.0	.9
25	171	6	90	4	2.5	1.0	.9
26	178	6	77	4	2.5	1.0	1.0
27	152	6	66	4	2.5	1.0	1.0
28	140	6	66	3.7	1.8	1.0	1.0
29	178	17	58	3.2	1.8	1.0	1.0
30	220	28	54	3.2	2.5	1.0	1.0
31	318	....	52	....	2.5	1.0	....

Monthly discharge of Burnt River at Bridgeport, Oreg., for the year ending Sept. 30, 1915.

Month.	Discharge in second-feet.			Run-off (total in acre-feet).	Accuracy.
	Maximum.	Minimum.	Mean.		
March 11-31	318	66	136	5,670	B.
April	278	6	89.7	5,340	B.
May	122	16	61.1	3,760	A.
June	117	3.2	15.0	893	B.
July	3.2	1.8	2.52	155	C.
August	2.5	1.0	1.42	87	C.
September	1.0	.9	.98	58	C.
The period	....	....	....	16,000	

MIDDLE FORK OF BURNT RIVER NEAR AUDREY, OREG.

Location.—In sec. 22, T. 12 S., R. 36 E., 4½ miles above mouth, 8 miles southeast of Audrey post office, and 8½ miles northeast of Unity, Baker County.

Drainage area.—Not measured.

Records available.—March 15 to September 30, 1915.

Gage.—Vertical staff nailed to willow tree on right bank, 600 feet below house of V. H. Campbell, observer.

Discharge measurements.—Made by wading.

Channel and control.—Gravel and tree roots; somewhat shifting.

Extremes of discharge.—Maximum stage recorded during year, 1.45 feet March 27 to April 2 (discharge, 4.3 second-feet); minimum stage recorded, 0.60 foot July 28 to September 30 (discharge, 0.4 second-foot).

Winter flow.—No records.

Diversions.—One ditch diverts water about a mile above the gage and irrigates about 100 acres.

Accuracy.—Stage-discharge relation not permanent. Two rating curves, each fairly well defined, used March 15–27 and March 28 to September 30, 1915. Daily discharge ascertained by applying gage heights to rating table. Records poor.

Cooperation.—Field data furnished by State engineer of Oregon.

Discharge measurements of Middle Fork of Burnt River near Audrey, Oreg., during the year ending Sept. 30, 1915.

Date.	Made by—	Gage height.	Discharge.	Date.	Made by—	Gage height.	Discharge.
		Feet.	*Sec.-ft.*			*Feet.*	*Sec.-ft.*
Mar. 15	C. G. Paulsen	1.00	0.7	May 5	H. K. Donnelly	1.15	1.5
Apr. 10	H. K. Donnelly	1.32	2.8	July 13	.....do	.65	.5

Daily discharge, in second-feet, of Middle Fork of Burnt River near Audrey, Oreg., for the year ending Sept. 30, 1915.

Day.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.
1		4.3	3.4	1.9	1.1	0.4	0.4
2		4.3	3.4	1.9	1.1	.4	.4
3		3.6	3.4	1.9	1.1	.4	.4
4		3.6	3.4	1.9	1.0	.4	.4
5		3.6	3.4	1.9	1.0	.4	.4
6		3.6		1.9	1.0	.4	.4
7		3.6		1.9	.7	.4	.4
8		2.8		1.6	.7	.4	.4
9		2.8		1.6	.7	.4	.4
10		2.8		1.6	.7	.4	.4
11		2.8		1.6	.7	.4	.4
12		2.8		1.6	.7	.4	.4
13		2.8		1.6	.7	.4	.4
14		2.8		1.6	.7	.4	.4
15	0.7	2.8		1.6	.6	.4	.4
16	.7	2.8		1.6	.6	.4	.4
17	.7	2.8		1.6	.6	.4	.4
18	.7	2.8		1.6	.6	.4	.4
19	.7	2.8		1.6	.6	.4	.4
20	.8	3.1		1.6	.6	.4	.4
21	.8	3.1	2.6	1.6	.6	.4	.4
22	1.0	3.1	2.6	1.6	.6	.4	.4
23	1.0	3.1	2.6	1.6	.6	.4	.4
24	1.0	3.1	2.6	1.6	.6	.4	.4
25	1.1	3.1	2.6	1.6	.6	.4	.4
26	1.1	3.1	2.6	1.6	.6	.4	.4
27	4.3	3.1	2.6	1.6	.6	.4	.4
28	4.3	3.1	2.6	1.6	.4	.4	.4
29	4.3	3.1	2.6	1.6	.4	.4	.4
30	4.3	3.4	2.6	1.6	.4	.4	.4
31	4.3		2.6		.4	.4	

Note.—Discharge May 6–20 estimated at 3 second-feet beacause of missing gage heights.

Monthly discharge of Middle Fork of Burnt River near Audrey, Oreg., for the year ending Sept. 30, 1915.

Month.	Discharge in second-feet.			Run-off (total in feet).	Accuracy.
	Maximum.	Minimum.	Mean.		
March 15-31	4.3	0.7	1.87	63	C.
April	4.3	2.8	3.15	187	B.
May	3.4	2.6	2.92	180	C.
June	1.9	1.6	1.67	99	C.
July	1.1	.4	.69	42	C.
August	.4	.4	.40	25	C.
September	.4	.4	.40	24	C.
The period				620	

SOUTH FORK OF BURNT RIVER NEAR UNITY, OREG.

Location.—In the NW. ¼ sec. 32, T. 13 S., R. 36 E., 100 feet below the mouth of Elk Creek, and 8½ miles southwest of Unity, Baker County.

Drainage area.—Not measured.

Records available.—March 14 to September 30, 1915.

Gage.—Vertical staff on right bank; read about every other day in April and weekly thereafter; gage reader, J. L. Hendricks.

Discharge measurements.—Made by wading.

Channel and control.—Gravel with some rock at control; fairly permanent.

Extremes of discharge.—Maximum stage recorded during year, 1.25 feet May 14 (discharge, 28 second-feet); minimum stage recorded, 0.82 foot April 28 (discharge, 12 second-feet), caused by diversion of water in Eldorado ditch.

Winter flow.—Stream does not freeze as most of the low-water flow comes from springs.

Diversions.—An old mining ditch, the Eldorado, diverts water from most of the tributaries of South Fork above the station. It carried water during the greater part of April over the Beam Creek divide into Willow Creek, where it was used for irrigation. The water was turned out May 1.

Accuracy.—Stage-discharge relation practically permanent. Rating curve well defined between 10 and 25 second-feet. Gage read about every other day during April, and weekly thereafter. Daily discharge ascertained by applying daily gage heights to rating table. Records fair.

Cooperation.—Gage heights furnished by Eastern Oregon Land Co.; measurements by State engineer of Oregon.

Discharge measurements of South Fork of Burnt River near Unity, Oreg., during the year ending Sept. 30, 1915.

Date.	Made by—	Gage height.	Discharge.	Date.	Made by—	Gage height.	Discharge.
		Feet.	*Sec.-ft.*			*Feet.*	*Sec.-ft.*
Mar. 14	C. G. Paulsen	1.03	19.8	June 11	H. K. Donnelly	1.12	21.9
Apr. 9	H. K. Donnelly	1.02	21.0	July 14	.....do	1.02	18.5
28	.....do	.82	11.6	Aug. 18	.....do	1.02	19.0

Daily discharge, in second-feet, of South Fork of Burnt River near Unity, Oreg., for the year ending Sept. 30, 1915.

Day.	Apr.	May.	June.	July.	Day.	Apr.	May.	June.	July.
1		20	23	19	16	18	26	22	19
2		25	23	19	17	18	27	22	19
3		28	23	19	18	17	26	22	19
4		26	22	19	19	17	26	21	19
5		24	22	19	20	17	25	21	19
6		22	22	19	21	17	25	21	18
7	25	22	22	20	22	16	25	21	18
8	22	23	22	20	23	15	25	21	18
9	19	23	23	20	24	15	25	20	18
10	19	23	23	20	25	14	25	20	18
11	18	24	23	19	26	14	24	20	18
12	18	25	23	19	27	12	24	20	18
13	18	27	23	19	28	12	24	20	18
14	18	28	23	19	29	20	24	20	18
15	17	28	23	19	30	25	24	20	18
					31		24		18

NOTE.—Discharge interpolated Apr. 8, 10-11, 13, 17-18, 20, 24-25, and after May 9, between readings made about once a week. Discharge estimated Apr. 29-30, May 2-7 as in table. Discharge Apr. 1-6 estimated at 22 second-feet.

Monthly discharge of South Fork of Burnt River near Unity, Oreg., for the year ending Sept. 30, 1915.

Month.	Discharge in second-feet.			Run-off (total in acre-feet).	Accuracy.
	Maximum.	Minimum.	Mean.		
March			[a] 20.0	1,230	C.
April	25	12	18.4	1,090	C.
May	28	22	24.7	1,520	C.
June	23	20	21.7	1,290	C.
July	20	18	18.8	1,160	C.
August			[a] 19.0	1,170	C.
September			[a] 19.0	1,130	C.
The period				8,590	

[a] Estimated.

SAWMILL CREEK[1] NEAR UNITY, OREG.

LOCATION.—In the NW. ¼ sec. 11, T. 13 S., R. 36 E., 100 yards above intake of Whited reservoir ditch, and 5 miles northwest of Unity, Baker County.

DRAINAGE AREA.—Not measured.

RECORDS AVAILABLE.—March 29 to June 28, 1915.

GAGE.—Vertical staff on left bank 150 yards above home of Mrs. Chas. Keesler, observer.

DISCHARGE MEASUREMENTS.—Made by wading.

CHANNEL AND CONTROL.—Rock and gravel; more or less filled with débris and brush.

DIVERSIONS.—None above station.

COOPERATION.—Records furnished by State engineer of Oregon.

Daily discharge not computed because of insufficient data; gage heights indicate the small and steady flow of the stream.

The following measurement was made by H. K. Donnelly:

April 11, 1915: Gage height, 0.32 foot; discharge, 0.5 second-foot.

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[1] Locally known as Pole Creek.

Daily gage height, in feet, of Sawmill Creek near Unity, Oreg., for the year ending Sept. 30, 1915.

Day.	Mar.	Apr.	May.	June.	Day.	Mar.	Apr.	May.	June.
1		0.32	0.30	0.35	16		.32	.42	.20
2			.30	.35	17		.32	.42	.15
3			.30	.35	18		.30	.42	.15
4			.35	.35	19		.30	.40	.15
5		.32	.35	.30	20		.30	.40	.15
6		.35	.35	.30	21		.30	.40	.15
7		.38	.35	.25	22		.30	.42	.15
8		.34	.35	.25	23		.30	.41	.12
9		.32	.38	.25	24		.28	.40	.12
10		.32	.39	.25	25		.28	.40	.10
11		.32	.40	.25	26		.25	.38	.10
12		.32	.40	.22	27		.25	.38	.10
13		.32	.42	.22	28	0.28	.25	.35	.10
14		.32	.45	.22	29	.32	.25	.35	
15		.32	.45	.20	30	.36	.35	.35	
					31	.30		.35	

NOTE.—No flow after about June 15.

CAMP CREEK NEAR HEREFORD, OREG.

LOCATION.—In the SW. ¼ sec. 29, T. 12 S., R. 38 E., half a mile above mouth and about 3 miles west of Hereford, on road to Unity, Baker County.

DRAINAGE AREA.—Not measured.

RECORDS AVAILABLE.—March 17 to April 6, 1915, after which channel was practically dry.

GAGE.—Vertical staff on lower side of wagon bridge, left bank; read daily by Culvin Hough.

DISCHARGE MEASUREMENTS.—Made by wading.

CHANNEL AND CONTROL.—Gravel; probably fairly permanent.

EXTREMES OF STAGE.—Maximum stage recorded, 1.80 feet April 3, but may have been higher prior to March 17. Channel dry at times.

DIVERSIONS.—Below all diversions; 1,250 acres of land irrigated from Camp Creek and East and West forks; some water also diverted in ordinary years by Eldorado ditch into Willow Creek watershed.

COOPERATION.—Field data furnished by State engineer.

Daily discharge not determined.

Discharge measurements of Camp Creek near Hereford, Oreg., during the year ending Sept. 30, 1915.

Date.	Made by—	Gage height.	Discharge.
		Feet.	*Sec.-ft.*
Mar. 17	C. G. Paulsen	1.05	11.5
Apr. 12	H. K. Donnelly	(a)	.25

[a] Water on opposite side of channel from gage.

Daily gage height, in feet, of Camp Creek near Hereford, Oreg., for the year ending Sept. 30, 1915.

Day.	Mar.	Apr.	Day.	Mar.	Apr.	Day.	Mar.	Apr.
1		1.00	11			21	1.00	
2		.80	12			22	1.02	
3		1.80	13			23	1.02	
4		1.20	14			24	1.02	
5		1.00	15			25	1.08	
6		.60	16			26	1.08	
7			17	1.05		27	.90	
8			18	1.02		28	.90	
9			19	1.00		29	1.08	
10			20	1.00		30	1.02	
						31	1.00	

POWDER RIVER NEAR NORTH POWDER, OREG.

Location.—In the NE. ¼ sec. 12, T. 6 S., R. 39 E., 3 miles northeast of North Powder, Union County; below all tributaries and return waters from irrigation in the North Powder Valley and above the backwater of the proposed Thief Valley resrevoir.

Drainage area.—775 square miles; at lower end of Thief Valley, 826 square miles.

Records available.—May 20, 1913, to September 30, 1915. The records at this station are almost directly comparable with those at the station below Thief Valley, March 9, 1909, to June 30, 1912, as the inflow between the two points constitutes only a negligible percentage of the total.

Gage.—Vertical staff on left bank just below entrance to short canyon below North Powder Valley. Gage reader, Mrs. H. C. Bidwell.

Discharge measurements.—Made from railway bridge one-fourth mile below gage or by wading.

Channel and control.—Rocks with some sand; probably shifts slightly.

Extremes of discharge.—Maximum stage recorded during year, 3.30 feet at 5 p. m. May 18 (discharge, 624 second-feet); minimum stage recorded, 0.32 foot September 1 and 3 (discharge, 1.8 second-feet).

1909–1915: Maximum stage recorded, 10.0 feet at lower station at 6.35 a. m. March 21, 1910 (discharge, 2,920 second-feet). Stream bed dry in August and September, 1910.

Winter flow.—Stage-discharge relation seriously affected by ice generally for about 3 months; flow estimated from discharge measurements, observer's notes, and temperature records.

Diversions.—Water is diverted from Powder River and its tributaries for irrigating 72,000 acres of land above this station.

Accuracy.—Stage-discharge relation practically permanent; affected by ice December 1 to February 24. Rating curve well defined between 30 and 600 second-feet. Daily discharge ascertained by applying daily gage heights to rating table. Open-water records good; winter records poor.

Discharge measurements of Powder River near North Powder, Oreg., during the year ending Sept. 30, 1915.

Date.	Made by—	Gage height.	Discharge.	Date.	Made by—	Gage height.	Discharge.
		Feet.	*Sec.-ft.*			*Feet.*	*Sec.-ft.*
Oct. 13	C. G. Paulsen	1.28	51.9	Mar. 26	C. G. Paulsen	2.11	187
Jan. 6	....do	[a] 2.40	55.5	Aug. 13	C. E. Stricklin	.38	2.4
Feb. 3	James E. Stewart	[a] 3.20	137				

[a] Stage-discharge relation affected by ice.

Daily discharge, in second-feet, of Powder River near North Powder, Oreg., for the year ending Sept. 30, 1915.

Day.	Oct.	Nov.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.
1	47	88	....	118	320	79	409	12	5.8	1.8
2	50	88	....	126	336	94	449	12	5.1	1.8
3	52	81	....	144	336	102	470	12	4.6	1.8
4	50	75	....	135	320	94	409	13	4.2	2.0
5	47	71	....	126	320	94	371	14	3.9	2.1
6	44	75	....	144	320	88	354	15	3.6	2.1
7	43	75	....	135	288	79	272	16	3.6	2.1
8	44	71	....	126	242	73	187	17	3.6	2.4
9	47	75	....	126	213	67	118	18	3.6	2.6
10	50	75	....	118	200	79	81	18	3.3	3.1
11	52	79	....	118	154	94	76	13	3.0	3.6
12	53	81	....	126	126	109	73	13	3.0	3.9
13	56	75	....	126	126	118	67	13	3.0	4.2
14	48	69	....	135	118	135	61	12	2.8	4.6
15	48	71	....	154	109	449	46	12	2.6	5.1
16	44	75	....	176	109	409	44	14	2.6	....
17	48	75	....	187	102	491	39	14	2.6	....
18	50	79	....	200	79	624	39	14	2.4	....
19	56	81	....	176	67	578	37	13	2.1	....
20	60	81	....	154	56	534	35	13	2.1	....
21	67	81	....	135	56	534	31	9.8	2.1	....
22	71	81	....	118	48	491	31	6.6	2.4	....
23	75	81	....	126	39	449	28	5.6	2.6	....
24	79	75	....	118	31	409	28	4.6	2.6	....
25	102	75	118	135	25	429	24	3.6	2.6	....
26	81	69	102	187	31	409	25	4.6	2.8	....
27	69	75	94	187	35	371	24	5.6	3.0	....
28	58	81	102	200	39	371	23	6.6	3.0	....
29	64	81	....	228	48	354	21	6.6	3.0	....
30	75	81	....	256	56	354	21	6.6	2.6	....
31	94	....	....	288	....	371	....	6.6	2.1	....

NOTE.—Gage read every other day, July to September; discharge interpolated. Discharge estimated because of ice as follows: December, 55 second-feet; January, 50 second-feet; Feb. 1-24, 110 second-feet. Stage-discharge relation affected by backwater from beaver dam Sept. 6-30 and discharge estimated as 8 second-feet.

Monthly discharge of Powder River near North Powder, Oreg., for the year ending Sept. 30, 1915.

Month.	Discharge in second-feet.			Run-off (total in acre-feet).	Accuracy.
	Maximum.	Minimum.	Mean.		
October	102	43	58.8	3,620	B.
November	88	69	77.3	4,600	B.
December	....	....	[a] 55.0	3,380	D.
January	....	....	[a] 50.0	3,070	D.
February	....	....	109	6,050	D.
March	288	118	156	9,590	B.
April	336	25	145	8,630	B.
May	624	67	288	17,700	B.
June	470	21	130	7,740	B.
July	18	3.6	11.1	682	C.
August	5.8	2.1	3.11	191	C.
September	....	1.8	5.44	324	D.
The year	624	1.8	90.6	65,600	

[a] Estimated.

SALMON RIVER AT SALMON, IDAHO.

LOCATION.—In sec. 6, T. 21 N., R. 22 E., at rear of Shoup's ranch buildings, 300 feet below the island, just above Lemhi River, and one-fourth mile below highway bridge at Salmon, Lemhi County.

DRAINAGE AREA.—3,600 square miles (Forest Service records).

RECORDS AVAILABLE.—April 25, 1912, to September 30, 1915.

Gage.—Inclined staff on left bank installed October 20, 1913; read by H. H. Power. Prior to October 20, 1913, gage was an inclined staff 30 feet upstream. Both gages referred to same datum but present gage reads about 0.08 foot less.

Discharge measurements.—Made from a cable 700 feet below gage.

Channel and control.—One channel at all stages; bed consists of rock overlaid with sand and gravel. Control shifts slightly.

Extremes of discharge.—Maximum stage recorded during year, 4.4 feet at 9 a. m. June 2 (discharge, 3,780 second-feet); minimum stage occurred during winter months (discharge not accurately known).

1912–1915: Maximum stage recorded, 8.3 feet June 1, 1913 (discharge, 12,800 second-feet); a discharge of 12,900 second-feet corresponding to a gage height of 8.2 feet occurred June 10, 1912. Minimum stage and discharge, not accurately known, occurred during winter months.

Winter flow.—Stage-discharge relation affected by ice December to January; discharge estimated from weather records and observer's notes.

Diversions.—A small ditch diverts from left bank between bridge and gage but its total capacity is less than 1 per cent of low-water flow.

Regulation.—None.

Accuracy.—State-discharge relation practically permanent during the year; affected by ice December 4 to February 10. Rating curve fairly well defined. Gage read to half-tenths once daily. Daily discharge, except during winter, ascertained by applying daily gage heights to rating table. Open-water records good; winter records poor.

The following discharge measurement was made by Martin and Stewart of the United States Forest Service:

November 27, 1914: Gage height, 2.44 feet; discharge, 1,260 second-feet.

Daily discharge, in second-feet, of Salmon River at Salmon, Idaho, for the year ending Sept. 30, 1915.

Day.	Oct.	Nov.	Dec.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.
1	1,520	1,520	1,230	......	1,100	1,140	2,200	3,620	2,330	1,570	1,060
2	1,620	1,520	1,180	......	1,060	1,140	2,200	3,780	2,460	1,520	1,060
3	1,840	1,520	1,140	......	1,100	1,180	2,080	3,620	2,590	1,420	1,140
4	1,840	1,520	1,140	......	1,100	1,180	1,960	3,460	2,660	1,420	1,140
5	1,840	1,520	......	......	1,060	1,180	1,840	3,010	2,730	1,420	1,140
6	1,840	1,420	......	......	1,100	1,230	1,730	2.940	2,870	1,420	1,100
7	1,620	1,420	......	......	1,100	1,230	1,620	2,870	2,870	1,420	1,080
8	1,420	1,420	......	......	1,100	1,230	1,620	2,870	3,160	1.420	1,100
9	1,420	1,420	......	......	1,100	1,270	1,620	3,010	3,010	1,420	1,100
10	1,420	1,420	......	......	1,100	1,320	1,620	3,010	3,160	1,320	1,140
11	1,420	1,420	......	1,320	1,100	1,420	1,730	3,010	3,020	1,270	1,140
12	1,420	1,320	......	1,230	1,100	1,420	1,840	3,160	2,870	1,230	1,140
13	1,420	1,320	......	1,100	1,100	1,520	1,840	3,010	2,590	1,180	1,100
14	1,420	1,320	......	1,100	1,100	1,620	1,960	2,870	2,590	1,180	1,140
15	1,420	1,320	......	1,100	1,100	1,730	2,080	2,590	2,330	1,180	1,140
16	1,420	1,320	......	1,060	1,100	1,730	2,080	2,590	2,330	1,180	1,140
17	1,420	1,230	......	1,060	1,100	1,840	2,200	2,590	2,080	1,180	1,100
18	1,420	1,230	......	1,100	1,140	1,840	2,200	2,590	1,900	1,140	1,100
19	1,420	1,230	......	1,100	1,140	1,840	2,330	2,590	1,730	1,140	1,140
20	1,420	1,230	......	1,100	1,140	1,960	2,460	2,590	1,730	1,100	1,140
21	1,520	1,230	......	1,100	1,140	1,960	2,730	2,590	1,620	1,140	1,140
22	1,620	1,230	......	1,060	1,140	2,080	2,870	2,590	1,620	1,140	1,100
23	1,620	1,180	......	1,100	1,140	1,960	2,870	2,590	1,620	1,100	1,060
24	1,620	1,180	......	1,100	1,180	1,960	2,870	2,870	1,620	1,140	1,060
25	1,570	1,180	......	1,100	1,230	1,960	2,870	2,870	1,520	1,140	1,060
26	1,520	1,270	......	1,100	1,180	2,080	3,010	3,160	1,520	1,060	1,180
27	1,520	1,270	......	1,100	1,140	2,080	3,010	2,810	2,590	1,060	1,270
28	1,520	1,270	......	1,100	1,140	2,080	3,160	2,460	1,520	1,060	1,270
29	1,520	1,270	......	......	1,140	2,080	3,160	2,460	1,620	976	1,180
30	1,520	1,270	......	......	1,140	2,080	3,310	2,330	1,520	1,060	1,140
31	1,520	......	......	......	1,140	......	3,460	......	1,620	1,060	......

Note.—Stage-discharge relation affected by ice Dec. 4 to Feb. 10; discharge estimated from weather records and observer's notes as follows: Dec. 4–31, 950 second-feet; Jan. 1–31, 1,000 second-feet; Feb. 1–10, 900 second-feet.

Monthly discharge of Salmon River at Salmon, Idaho, for the year ending Sept. 30, 1915.

Month.	Discharge in second-feet.			Run-off (total in acre-feet).	Accuracy.
	Maximum.	Minimum.	Mean.		
October	1,840	1,420	1,540	94,700	A.
November	1,520	1,180	1,330	79,100	A.
December			979	60,200	D.
January			1,000	61,500	D.
February			1,040	57,800	C.
March	1,230	1,060	1,120	68,900	B.
April	2,080	1,140	1,640	97,600	B.
May	3,460	1,620	2,340	144,000	B.
June	3,780	2,330	2,880	171,000	B.
July	3,160	1,520	2,240	138,000	B.
August	1,570	976	1,230	75,600	B.
September	1,270	1,060	1,130	67,200	B.
The year	3,780		1,540	1,120,000	

NOTE.—See footnote to table of daily discharge.

SALMON RIVER AT WHITEBIRD, IDAHO.

LOCATION.—In sec. 22, T. 28 N., R. 1 E., at Canfield Ferry at Whitebird, Idaho; just below Whitebird Creek and below all important tributaries.

DRAINAGE AREA.—13,600 square miles (measured on General Land Office map, edition of 1909).

RECORDS AVAILABLE.—August 8, 1910, to September 30, 1915.

GAGE.—Inclined staff in two sections; lower section, on right bank, installed August 18, 1910; upper section, on left bank, installed November 3, 1911. Gage read by James Tierney from October 1, 1914, to June 12, 1915, and by William Cantonwine from June 13 to September 30, 1915.

DISCHARGE MEASUREMENTS.—Made from gaging car suspended from ferry cable 75 feet above gage.

CHANNEL AND CONTROL.—One channel at all stages; banks not subject to overflow. Channel straight for a quarter of a mile below gage, but curved slightly immediately above. Control composed of heavy boulders 1,000 feet below gage; practically permanent.

EXTREMES OF DISCHARGE.—Maximum stage recorded during year, 10.59 feet at 8 a. m. June 2 (discharge, 33,800 second-feet); minimum stage recorded, 1 foot at 8.30 a. m. December 12 (discharge, 2,800 second-feet).

1910–1915: Maximum stage recorded, 19.7 feet at 7 a. m. May 28, 1913 (discharge, 81,200 second-feet); minimum stage recorded December 12, 1914.

WINTER FLOW.—Stage-discharge relation not seriously affected by ice; open-channel rating curve assumed applicable.

DIVERSIONS.—An inconsiderable amount of water is used for irrigation above gaging station.

REGULATION.—None.

ACCURACY.—Stage-discharge relation practically permanent; affected by ice for a few days in December. Rating curve well defined above 3,000 second-feet. Gage read to hundredths twice daily. Daily discharge ascertained by applying gage heights to rating table. Records excellent.

No discharge measurements were made during the year.

Daily discharge, in second-feet, of Salmon River at Whitebird, Idaho, for the year ending Sept. 30, 1915.

Day.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.
1	4,630	5,770	4,320	3,760	3,890	3,760	5,170	14,900	30,800	13,100	6,840	3,510
2	4,800	5,980	3,890	3,630	4,030	3,760	5,170	14,500	33,400	12,800	6,840	3,890
3	5,170	5,980	3,760	3,630	4,170	3,760	5,770	14,200	30,300	10,500	6,400	4,470
4	5,370	5,770	4,030	3,630	4,030	3,760	6,400	12,800	27,900	10,500	6,190	4,470
5	5,170	5,570	4,470	3,510	3,890	3,760	6,840	11,800	27,000	10,500	5,980	4,470
6	5,370	5,370	4,470	3,510	3,760	3,760	6,620	11,100	26,100	10,500	5,570	4,170
7	5,370	5,170	4,170	3,510	3,630	3,760	6,620	11,100	25,200	11,800	5,570	4,170
8	5,170	5,170	3,890	3,510	3,630	3,630	6,620	11,100	24,700	14,900	5,370	4,030
9	5,370	4,980	3,630	3,630	3,630	3,630	6,620	11,800	24,300	14,900	5,370	3,890
10	4,980	4,800	3,170	3,760	3,760	3,630	6,400	12,400	23,400	15,600	5,170	4,030
11	5,170	4,800	2,800	3,760	3,760	3,630	6,620	13,800	22,000	14,200	4,980	4,170
12	5,170	4,800	2,800	3,630	3,760	3,760	7,300	14,500	22,500	12,800	4,800	4,470
13	4,980	5,170	2,970	3,630	3,760	3,760	9,100	14,500	22,000	11,400	4,800	4,630
14	5,170	5,170	2,970	3,630	3,630	3,890	10,500	15,200	20,700	10,500	4,800	4,470
15	5,170	5,170	2,970	3,630	3,390	3,890	9,930	15,600	19,900	10,500	4,630	4,470
16	5,170	4,800	2,970	3,760	3,390	4,030	9,930	15,200	19,500	10,500	4,470	4,470
17	5,170	4,320	2,970	3,760	3,510	4,030	10,500	15,600	19,100	10,500	4,320	4,470
18	5,370	4,470	2,970	3,760	3,630	4,030	11,800	17,100	19,100	10,500	4,170	4,320
19	5,800	4,470	2,970	3,510	3,890	4,170	13,500	22,500	19,100	9,930	3,890	4,320
20	6,920	4,170	2,970	3,390	3,890	4,030	14,500	27,500	19,500	9,370	3,630	4,170
21	6,920	4,170	2,970	3,390	3,890	4,030	14,900	27,000	18,300	8,830	3,390	4,030
22	6,400	4,170	2,970	3,390	3,890	4,170	15,600	26,100	16,700	8,300	3,170	4,030
23	6,190	4,170	3,070	3,070	3,890	4,320	14,900	25,200	16,400	7,790	3,070	3,890
24	5,980	4,470	3,170	2,970	3,760	4,800	14,500	24,300	16,000	7,540	3,070	3,890
25	5,770	4,630	3,280	2,880	3,890	5,170	13,100	24,700	16,400	7,300	2,970	3,890
26	5,770	4,470	3,390	2,970	3,890	4,980	12,400	22,900	17,500	6,840	2,970	3,890
27	5,570	4,470	3,630	3,170	3,890	4,800	13,100	21,600	18,300	6,840	2,970	4,170
28	5,570	4,320	3,630	3,390	3,890	4,630	13,800	24,300	16,000	6,840	2,880	4,470
29	5,370	4,470	3,890	3,510	....	4,800	15,200	28,900	14,500	7,070	2,970	4,630
30	5,370	4,470	3,890	3,630	....	4,980	15,200	27,500	13,500	6,840	3,170	4,470
31	5,570	....	3,890	3,760	....	5,170	....	26,600	....	6,840	3,280	....

Note.—Discharge estimated, because of ice, Dec. 19-20, 24.

Monthly discharge of Salmon River at Whitebird, Idaho, for the year ending Sept. 30, 1915.

Month.	Discharge in second-feet.			Run-off (total in acre-feet).	Accuracy.
	Maximum.	Minimum.	Mean.		
October	6,920	4,630	5,480	337,000	A.
November	5,980	4,170	4,860	289,000	A.
December	4,470	2,800	3,450	212,000	A.
January	3,760	2,880	3,510	216,000	A.
February	4,170	3,390	3,790	210,000	A.
March	5,170	3,630	4,140	255,000	A.
April	15,600	5,170	10,300	613,000	A.
May	28,900	11,100	18,600	1,140,000	A.
June	33,400	13,500	21,300	1,270,000	A.
July	15,600	6,840	10,200	627,000	A.
August	6,840	2,880	4,440	273,000	A.
September	4,630	3,510	4,210	251,000	A.
The year	33,400	2,800	7,860	5,690,000	

GRANDE RONDE RIVER AT HILGARD, OREG.

Location.—In the SW. ¼ sec. 32, T. 2 S., R. 37 E., half a mile east of Hilgard, Union County, at the county highway bridge just below Five Points Creek, about 8 miles above head of Grande Ronde Valley.

Drainage area.—660 square miles.

Records available.—November 6, 1903, to March 3, 1910; October 1, 1910, to September 30, 1915, when station was discontinued.

Gage.—Vertical staff nailed to right abutment of former bridge; used since January 5, 1912. Gage reader, J. W. Scott. Gage on pier of former bridge used November 6, 1903, to March 4, 1910, when bridge and gage were washed away. Gage on left abutment of the same bridge used 1910 and 1911.

Discharge measurements.—Made from downstream side of new steel bridge about 20 feet below gage, or by wading.

Channel and control.—Sand and gravel; fairly permanent. The use of the stream for log driving formerly affected the stage-discharge relation, especially for about two months in early summer; no logs have been driven since about 1910.

Extremes of discharge.—Maximum stage recorded during year, 3.05 feet April 13 (discharge, 1,240 second-feet); minimum stage recorded, 0.50 foot August 30–31 (discharge, 15 second-feet).

1903–1915: Maximum stage recorded, 8.0 feet March 17, 1908; maximum discharge, 4,610 second-feet (gage height, 7.5 feet) April 14, 1904. Minimum stage recorded, 2.20 feet June 25, 26, 30, July 1, 1905 (discharge, 3 second-feet), caused by holding back water in logging dams. Minimum stage recorded since 1909, when the splashing ceased, 0.68 foot September 22 and 23, 1913 (discharge, 14.8 second-feet).

Winter flow.—Stage-discharge relation seriously affected by ice about two months (average) each winter; flow estimated from meter measurements, observer's notes, and studies of weather records.

Regulation.—Practically none at present.

Accuracy.—Stage-discharge relation practically permanent during the year; affected by ice from December 9 to February 13. Rating curve well defined. Daily discharge (except for winter) ascertained by applying daily gage heights to rating table. Open-water records good; winter records poor.

Discharge measurements of Grande Ronde River at Hilgard, Oreg., during the year ending Sept. 30, 1915.

Date.	Made by—	Gage height.	Discharge.	Date.	Made by—	Gage height.	Discharge.
		Feet.	*Sec.-ft.*			*Feet.*	*Sec.-ft.*
Jan. 7	C. G. Paulsen	[a]1.15	23.6	Mar. 23	C. G. Paulsen	2.11	444
Feb. 3	James E. Stewart	[a]1.46	32.7	Aug. 12	C. E. Stricklin	.62	20.9

[a] Stage-discharge relation affected by ice.

Daily discharge, in second-feet, of Grande Ronde River at Hilgard, Oreg., for the year ending Sept. 30, 1915.

Day.	Oct.	Nov.	Dec.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.
1	28	42	38	......	76	725	240	645	60	34	18
2	37	42	49	......	67	725	220	570	52	34	18
3	49	42	46	......	67	1,240	220	570	52	34	18
4	52	39	44	......	76	990	240	440	52	28	18
5	47	39	46	......	76	768	301	390	60	28	18
6	40	39	46	......	76	645	301	345	60	28	18
7	39	39	39	......	76	645	345	345	103	28	18
8	39	39	28	......	70	390	390	301	103	28	19
9	39	39	......	......	70	390	390	259	94	28	19
10	39	39	......	......	70	368	390	240	94	24	19
11	52	39	......	......	84	368	415	259	84	24	19
12	52	39	......	......	103	368	645	301	67	20	22
13	52	39	......	......	103	390	645	259	64	20	28
14	42	39	......	103	152	345	810	259	67	20	26
15	39	37	......	114	220	323	725	220	94	20	24
16	39	28	......	125	259	323	645	184	94	34	26
17	44	28	......	125	259	323	725	168	84	28	26
18	44	28	......	114	301	323	855	152	67	24	26
19	55	28	......	103	259	323	810	138	52	20	26
20	67	34	......	94	240	301	725	125	46	20	26
21	58	46	......	84	301	293	685	125	46	20	24
22	52	42	......	84	440	280	768	114	39	20	24
23	52	39	......	84	470	280	725	103	39	19	22
24	52	39	......	67	390	259	810	114	37	18	22
25	51	42	......	76	570	228	810	125	34	18	22
26	49	52	......	76	301	228	810	125	30	18	24
27	46	52	......	76	280	213	855	103	30	18	24
28	46	52	......	76	301	202	945	94	34	18	26
29	46	52	......	......	810	220	810	84	34	18	26
30	46	42	......	......	810	240	725	60	28	15	26
31	46	......	......	......	768	......	645	......	28	15	......

NOTE.—Discharge during ice period estimated as follows: Dec. 9–16, 20 second-feet; Dec. 17–31, 15 second-feet; Jan. 1–7, 20 second-feet; Jan. 8–31, 25 second-feet; Feb. 1–13, 55 second-feet.

Monthly discharge of Grande Ronde River at Hilgard, Oreg., for the year ending Sept. 30, 1915.

Month.	Discharge in second-feet.			Run-off (total in acre-feet).	Accuracy.
	Maximum.	Minimum.	Mean.		
October	67	28	46.5	2,800	B.
November	52	28	39.9	2,370	B.
December	49	....	23.3	1,430	C.
January	....	....	23.9	1,470	D.
February	125	....	75.6	4,200	C.
March	810	67	263	16,200	B.
April	1,240	202	424	25,200	B.
May	945	220	601	37,000	B.
June	645	60	241	14,300	B.
July	103	28	59.0	3,630	B.
August	34	15	23.3	1,430	B.
September	28	18	22.4	1,330	B.
The year	1,240	15	154	111,000	

CATHERINE CREEK NEAR UNION, OREG.

LOCATION.—In the SW. ¼ sec. 1, T. 5 S., R. 40 E., 50 yards below a ford, one-fourth mile from Godsey's ranch house, and 8 miles southeast of Union, Union County.

DRAINAGE AREA.—96 square miles.

RECORDS AVAILABLE.—July 20, 1911, to September 30, 1912, and March 20 to September 14, 1915. Also, May 15, 1906, to May 18, 1907, at a station about 1½ miles below.

GAGE.—Vertical staff spiked to clump of alders on left bank; somewhat difficult to read accurately. Gage reader, Mrs. S. T. Godsey.

Discharge measurements.—Made from bridge about 400 feet above gage or by wading.

Channel and control.—Gravel; shifting in floods; one channel at all stages.

Extremes of discharge.—Maximum stage recorded during year, 2.02 feet at 3.50 p. m. May 18 (discharge, 498 second-feet); minimum stage recorded, 0.12 foot September 1–7 (discharge, 24 second-feet).

1906–7, 1911–12, and 1915: Maximum stage recorded, 4.60 feet at old station, May 17, 1907 (discharge estimated from extension of rating curve as 1,120 second-feet); minimum discharge (obtained as result of measurement January 13, 1913), 19.5 second-feet.

Winter flow.—Stage-discharge relation seriously affected by ice for short periods; flow usually estimated.

Diversions.—Above all ditches except one which irrigates about 18 acres.

Regulation.—None.

Accuracy.—Stage-discharge relation practically permanent during the year. Rating curve fairly well defined between 50 and 500 second-feet; poorly defined below 50 second-feet. Daily discharge ascertained by applying daily gage heights to rating table. Records good except for low-water period, for which they are fair.

Cooperation.—Field data furnished by the State engineer.

Discharge measurements of Catherine Creek near Union, Oreg., during the year ending Sept. 30, 1915.

Date.	Made by—	Gage height.	Discharge.
		Feet.	*Sec.-ft.*
Mar. 20	C. G. Paulsen	0.44	66.6
Apr. 10	C. E. Stricklin	1.00	182
May 18	.....do	1.95	475

Daily discharge, in second-feet, of Catherine Creek near Union, Oreg., for the year ending Sept. 30, 1915.

Day.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.
1	....	135	232	359	104	45	24
2	....	146	206	314	99	42	24
3	....	206	182	290	95	42	24
4	....	232	182	260	95	35	24
5	....	206	182	260	81	35	24
6	....	206	194	260	77	35	24
7	....	182	194	254	86	35	24
8	....	182	206	246	77	35	27
9	....	182	206	246	99	32	27
10	....	182	219	227	77	32	27
11	....	206	232	206	77	32	27
12	....	246	232	206	68	32	30
13	....	290	320	194	63	32	35
14	....	232	336	182	63	32	32
15	....	232	336	175	60	32	....
16	....	232	336	170	60	32	....
17	....	232	403	170	68	32	....
18	....	232	486	170	63	32	....
19	....	260	483	170	60	32	....
20	67	290	454	158	57	32	....
21	77	290	403	146	52	32	....
22	95	246	379	135	48	30	....
23	114	246	320	124	48	30	....
24	114	206	320	124	45	30	....
25	99	206	305	146	45	30	....
26	91	194	296	135	45	30	....
27	77	206	284	114	45	27	....
28	95	206	386	110	45	27	....
29	158	275	369	99	57	27	....
30	135	260	352	104	48	27	....
31	135	....	352	....	45	27	....

Monthly discharge of Catherine Creek near Union, Oreg., for the year ending Sept. 30, 1915.

[Drainage area, 96 square miles.]

Month.	Discharge in second-feet.				Run-off.		Accuracy.
	Maximum.	Minimum.	Mean.	Per square mile.	Depth in inches on drainage area.	Total in acre-feet.	
March 20-31	158	67	105	1.09	0.49	2,500	A.
April	290	135	222	2.31	2.58	13,200	A.
May	486	182	303	3.16	3.64	18,600	B.
June	359	99	192	2.00	2.23	11,400	A.
July	104	45	66.2	.690	.80	4,070	B.
August	45	27	32.4	.337	.39	1,990	B.
September 1-14	35	24	26.6	.277	.14	739	B.
The period						52,500	

LITTLE CREEK NEAR UNION, OREG.

Location.—In the SE. ¼ sec. 14, T. 4 S., R. 40 E., on the Southerland ranch, 6 miles east of Union, Union County; just below a small tributary from the south.

Drainage area.—Not measured.

Records available.—April 11 to September 14, 1915.

Gage.—Vertical staff on east bank. Gage reader, C. H. Moore.

Discharge measurements.—Made from footbridge at gage.

Channel and control.—Firm gravel; probably permanent except in extreme floods. One channel at all stages.

Diversions.—147 acres irrigated above the station.

Cooperation.—Data furnished by State Engineer of Oregon.

Daily discharge not computed because of lack of high-water measurements.

Discharge measurements of Little Creek near Union, Oreg., during the year ending Sept. 30, 1915.

[Made by C. E. Stricklin.]

Date.	Gage height.	Discharge.
	Feet.	*Sec.-ft.*
Apr. 11	0.90	22.
Apr. 29	1.05	53.
Sept. 14	.40	1.

Daily gage height, in feet, of Little Creek near Union, Oreg., for the year ending Sept. 30, 1915.

Day.	Apr.	May.	June.	July.	Aug.	Sept.	Day.	Apr.	May.	June.	July.	Aug.	Sept.
1		1.00	1.30	0.75	0.55	0.40	16	0.90	1.30	0.90	0.65	0.45	
2		.95	1.25	.70	.55	.40	17	.90	1.70	.90	.65	.45	
3		.95	1.20	.70	.55	.40	18	.90	1.95	.85	.65	.45	
4		.95	1.20	.65	.55	.40	19	.95	2.10	.80	.65	.45	
5		.95	1.15	.65	.55	.40	20	.95	1.90	.80	.65	.40	
6		.95	1.15	.65	.55	.40	21	.95	1.65	.80	.65	.40	
7		.95	1.10	.70	.55	.40	22	.90	1.60	.80	.60	.40	
8		.95	1.10	.70	.50	.40	23	.95	1.40	.80	.60	.40	
9		.95	1.05	.70	.50	.40	24	.95	1.35	.80	.60	.40	
10		1.10	1.00	.70	.50	.40	25	.95	1.35	.80	.55	.40	
11	0.90	1.10	1.00	.65	.50	.40	26	.95	1.30	.80	.55	.40	
12	.95	1.10	1.00	.65	.50	.50	27	.95	1.25	.80	.55	.40	
13	.95	1.40	1.00	.65	.45	.45	28	.95	1.35	.75	.55	.40	
14	.95	1.45	.90	.65	45	.40	29	.95	1.35	.75	.60	.40	
15	.95	1.35	.90	.65	.45		30	1.00	1.25	.75	.60	.40	
							31		1.20		.60	.40	

MILL CREEK NEAR SUMMERVILLE, OREG.

Location.—In the NE. ¼ sec. 35, T. 1 N., R. 38 E., about 2¼ miles north of Summerville, Union County.

Drainage area.—Indeterminate; practically all the flow of the creek comes from springs.

Records available.—July 11, 1914, to April 3, 1915, when station was discontinued.

Gage.—Vertical staff on the supports of a flume; read by C. E. Boggs.

Discharge measurements.—Made by wading.

Channel and control.—Gravel; fairly permanent.

Extremes of stage.—Maximum stage recorded during period of record, 0.65 foot October 19, 1914, and February 19, 1915; minimum stage recorded, 0.40 foot December 27, 1914, to January 10, 1915; January 16–29, 31, 1915.

Winter flow.—Discharge apparently slightly reduced during cold weather, but stage-discharge relation unaffected.

Diversions.—None.

Regulation.—None.

Cooperation.—Gage heights furnished by Kleis Electric Co.

Discharge not computed, as measurements do not cover range of stage.

The following measurement was made by James E. Stewart:

February 4, 1915: Gage height, 0.54 foot; discharge, 13.8 second-feet.

Daily gage height, in feet, of Mill Creek, near Summerville, Oreg., for the year ending Sept. 30, 1915.

Day.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.
1	0.55	0.55	0.55	0.40	0.45	0.55	0.55
2	.55	.55	.55	.40	.55	.55	.55
3	.55	.55	.55	.40	.45	.55	.60
4	.55	.55	.55	.40	.50	.60	....
5	.55	.55	.55	.40	.55	.55	....
6	.55	.55	.55	.40	.55	.55	....
7	.55	.55	.55	.40	.55	.60	....
8	.55	.55	.55	.40	.55	.60	....
9	.55	.55	.55	.40	.55	.55	....
10	.55	.55	.55	.40	.55	.55	....
11	.55	.55	.55	.45	.55	.55	....
12	.55	.55	.55	.50	.55	.55	....
13	.55	.55	.50	.45	.55	.55	....
14	.55	.55	.55	.50	.55	.55	....
15	.55	.55	.50	.45	.55	.55	....
16	.55	.55	.55	.40	.55	.55	....
17	.60	.55	.50	.40	.55	.55	....
18	.60	.55	.55	.40	.60	.55	....
19	.65	.55	.50	.40	.65	.52	....
20	.60	.55	.50	.40	.60	.50	....
21	.60	.55	.50	.40	.60	.50	....
22	.55	.55	.50	.40	.60	.50	....
23	.55	.55	.50	.40	.55	.50	....
24	.55	.55	.50	.40	.55	.50	....
25	.55	.55	.50	.40	.55	.50	....
26	.55	.55	.50	.40	.55	.50	....
27	.55	.55	.40	.40	.55	.50	....
28	.55	.55	.40	.40	.55	.50	....
29	.55	.55	.40	.40	....	.50	....
30	.55	.55	.40	.45	....	.55	....
31	.55	.55	.40	.40	....	.55	....

WALLOWA LAKE NEAR JOSEPH, OREG.

Location.—In sec. 5, T. 3 S., R. 45 E., near outlet of Wallowa Lake, about a mile above Joseph, Wallowa County.

Records available.—July 15, 1905, to July 28, 1906; January 13, 1912, to March 31, 1914; May 21 to Sept. 25, 1915.

Lake area.—1,528 acres at low water and 1,548 acres at high water, according to survey made for the State Water Board in 1915.

Gage.—Vertical staff spiked to shore side of pile supporting boathouse some distance above dam at outlet. Read by J. W. Winston. The gage used in 1905–6 was placed on upstream side of dam at outlet. Its datum was the floor of the sluiceway. No determined relation between the gage used in 1905–6 and present gage.

Storage.—Wallowa Lake reservoir is operated for the benefit of four ditches which divert between the lake and Joseph. The reservoir is allowed to remain practically empty during the winter and is filled during the flood run-off in May and June and emptied during August and September. The usual variation in level has been about 6.5 feet.

Extremes of stage.—Maximum stage recorded 1911 to 1915, 8.05 feet June 8, 1915; minimum stage recorded, 1.25 feet January 18 and February 1 to May 29, 1913.

Daily gage height, in feet, of Wallowa Lake near Joseph, Oreg., for the year ending Sept. 30, 1915.

Day.	Mar.	May.	June.	July.	Aug.	Sept.	Day.	Mar.	May.	June.	July.	Aug.	Sept.
1	......	......	8.00	4.90	2.62	1.88	16	......	......	7.72	4.00	1.88	1.72
2	......	......	8.00	4.48	2.55	1.88	17	......	......	7.78	3.92	1.85	1.70
3	......	......	7.98	4.35	2.45	1.85	18	......	......	7.50	3.95	1.85	1.68
4	......	......	7.90	4.20	2.30	1.85	19	......	......	7.40	4.00	1.82	1.65
5	......	......	7.92	4.00	2.22	1.85	20	......	......	7.35	4.02	1.82	1.65
6	......	......	8.00	4.00	2.15	1.85	21	......	7.12	7.10	4.05	1.82	1.63
7	......	......	8.02	3.95	2.05	1.85	22	1.50	7.20	6.90	4.05	1.80	1.65
8	......	......	8.05	3.95	2.02	1.85	23	......	7.28	6.65	4.05	1.80	1.62
9	......	......	8.00	4.00	2.00	1.85	24	......	7.35	6.45	4.05	1.82	1.62
10	......	......	8.00	4.00	1.90	1.85	25	......	7.40	6.32	3.90	1.85	1.62
11	......	......	7.95	4.05	1.95	1.85	26	......	7.50	6.20	3.80	1.88	......
12	......	......	7.95	4.10	1.95	1.82	27	......	7.58	5.85	3.60	1.90	......
13	......	......	7.90	4.05	1.92	1.80	28	......	7.72	5.58	3.45	1.90	......
14	......	......	7.85	4.00	1.90	1.78	29	......	7.92	5.10	3.22	1.90	......
15	......	......	7.80	4.00	1.88	1.75	30	......	8.00	4.85	3.00	1.90	......
							31	......	8.00	......	2.70	1.88	......

WALLOWA RIVER AT JOSEPH, OREG.

Location.—In sec. 5, T. 3 S., R. 45 E., about 300 feet below the regulating dam at the outlet of Wallowa Lake, and 50 feet above footbridge; half a mile above Joseph, Wallowa County, above the head gates of four irrigating ditches, the first taking out 125 feet below the gage.

Drainage area.—52 square miles.

Records available.—November 12, 1903, to August 23, 1907; June 14, 1908, to March 31, 1914; May 20 to September 25, 1915.

Gage.—Vertical staff bolted to a large boulder on right bank, used since July 12, 1905. Read by J. W. Winston. Original gage, read November 12, 1903, to March 30, 1905, on lake. Temporary gage 100 feet below dam, March 31 to July 11, 1905.

Discharge measurements.—Made by wading at low water; formerly from footbridge.

Channel and control.—Boulders; practically permanent; banks are seldom overflowed; current swift and velocities uneven across section.

Extremes of discharges.—Maximum stage recorded during year, 3.20 feet at 8 a. m. June 23 (discharge, 560 second-feet); minimum stage recorded, 1.88 feet at time of measurement March 22 (discharge, 41.6 second-feet).

1904–1915: Maximum stage recorded, 3.60 feet June 12–13, 1912 (discharge, 850 second-feet). This can not be corrected to natural flow. Minimum stage recorded, 1.8 feet September 27, 30, October 1, 1906, February 17 to March 16, 1907 (discharge from revised curve, 30 second-feet). This is probably the natural flow.

Winter flow.—Discharge relation unaffected by ice on account of proximity to the lake outlet.

Regulation.—About 10,000 acre-feet of storage has been developed in Wallowa Lake; used since 1905, and monthly discharge corrected for storage since 1912.

Accuracy.—Stage-discharge relation practically permanent. Rating curve fairly well defined between 40 and 400 second-feet and poorly defined outside these limits. Daily discharge ascertained by applying gage heights to rating table. Monthly mean discharge corrected for storage in Wallowa Lake before computing discharge in second-feet per square mile and run-off in depth in inches. Records good.

The following discharge measurement was made by C. G. Paulsen:

March 22, 1915: Gage height, 1.88 feet; discharge, 41.6 second-feet.

Daily discharge, in second-feet, of Wallowa River at Joseph, Oreg., for the year ending Sept. 30, 1915.

Day.	May.	June.	July.	Aug.	Sept.	Day.	May.	June.	July.	Aug.	Sept.
1	......	325	465	280	80	16	......	350	240	135	60
2	......	350	435	260	80	17	......	375	240	135	60
3	......	335	435	240	80	18	......	405	220	135	60
4	......	240	435	220	80	19	......	405	200	129	60
5	......	240	435	200	80	20	......	387	172	129	60
6	......	325	435	182	80	21	105	447	165	120	44
7	......	375	465	172	76	22	111	465	232	111	44
8	......	387	405	172	76	23	111	560	220	105	44
9	......	375	375	165	70	24	129	527	325	76	44
10	......	302	375	165	70	25	135	450	325	76	44
11	......	325	350	165	64	26	135	495	302	80	......
12	......	325	325	150	64	27	135	435	280	80	......
13	......	272	280	141	64	28	150	547	375	80	......
14	......	240	280	141	64	29	248	495	325	80	......
15	......	289	260	141	60	30	302	405	289	80	......
						31	325	......	325	80	......

Note.—Discharge estimated June 25 because of change in gates at Wallowa Lake.

Monthly discharge of Wallowa River at Joseph, Oreg., for period May 21 to Sept. 25, 1915.

[Drainage area, 52 square miles.]

Month.	Discharge (second-feet).			Run-off (total in acre-feet).			Discharge without storage (second-feet).		Run-off (depth in inches on drainage area).	Accuracy.
	Maximum.	Minimum.	Mean.	Observed.	Stored.	Without storage.	Mean.	Per square mile.		
May 21–31	325	111	171	3,730	+1,350	5,080	228	4.38	1.79	B.
June	560	240	382	22,700	—4,820	17,900	301	5.79	6.46	B.
July	465	165	323	19,900	—3,290	16,600	270	5.19	5.98	B
August	280	80	143	8,790	—1,250	7,540	123	2.37	2.73	B.
September 1–25	80	44	643	3,190	— 398	2,790	56.2	1.08	1.00	B.
The period	......	......	......	58,300	—8,410	49,900	......	......	......	

Note.—The dam on Wallowa Lake was closed before the stream rose in April, and the water overflowed the dam about May 21; discharge Oct. 1 to May 20 and Sept. 26–30 probably averaged close to 40 second-feet. This assumption would give the total run-off for the year as about 77,000 acre-feet.

SILVER LAKE DITCH NEAR JOSEPH, OREG.

Location.—In the SW. ¼ sec. 32, T. 2 S., R. 45 E., about 500 feet below the ice pond south of Joseph.

Records available.—July 12 to December 31, 1905; May 23 to September 4, 1915.

Gage.—Vertical staff on east bank of ditch; read daily by R. H. Clark.

Discharge measurements.—Made from collar of flume.

Channel and control.—Excavated in clay soil, not likely to shift.

Extremes of discharge.—Maximum stage recorded during year, 3.75 feet July 1-2 and 6-9 (discharge, 104 second-feet). Canal dry at times.

Accuracy.—Records good.

Silver Lake ditch diverts water from Wallowa River in the NW. ¼ sec. 5, T. 3 S., R. 45 E., about 500 feet below dam at outlet of Wallowa Lake, for irrigating 4,165 acres of land lying east and north of Joseph.

Discharge measurements of Silver Lake ditch near Joseph, Oreg., during the year ending Sept. 30, 1915.

[Made by C. E. Stricklin.]

Date.	Gage height.	Discharge.	Date.	Gage height.	Discharge.	Date.	Gage height.	Discharge.
	Feet.	*Sec.-ft.*		*Feet.*	*Sec.-ft.*		*Feet.*	*Sec.-ft.*
June 18	3.40	74.9	July 6	3.75	105	Aug. 4	2.88	42.9
22	3.65	94.5	27	3.25	64.1	Sept. 8	2.40	16.1

Daily discharge, in second-feet, of Silver Lake ditch near Joseph, Oreg., for the year ending Sept. 30, 1915.

Day.	May.	June.	July.	Aug.	Sept.	Day.	May.	June.	July.	Aug.	Sept.
1		1.0	104	64	17	16		82	75	44	
2		1.0	104	61	17	17		82	75	43	
3		1.0	90	61	17	18		82	68	43	
4		1.0	90	60		19		78	55	40	
5		1.0	90	58		20		82	58	40	
6		37	104	60		21		90	55	37	
7		40	104	58		22		88	55	37	
8		43	104	58		23		94	55	17	
9		43	104	55		24		94	64	17	
10		61	101	50		25		94	68	17	
11		90	94	49		26		94	61	17	
12		90	90	49		27		94	64	17	
13		90	86	46		28		99	67	17	
14		90	86	46		29		97	64	17	
15		90	61	46		30	1.0	99	67	17	
						31	1.0		67	17	

Note.—Daily discharge determined from rating curve well-defined above 10 second-feet; not defined below.

Monthly discharge of Silver Lake ditch near Joseph, Oreg., for the year ending Sept. 30, 1915.

Month.	Discharge in second-feet.			Run-off (total in acre-feet).	Accuracy.
	Maximum.	Minimum.	Mean.		
June	99	1	67.6	4,020	A.
July	104	55	78.4	4,820	A.
August	64	17	40.6	2,500	A.
The period				11,300	

FARMERS' DITCH[1] AT JOSEPH, OREG.

Location.—In the SW. ¼ sec. 32, T. 2 S., R. 45 E., at south end of Main Street, Joseph, Wallowa County, about 50 feet above the crossing of the city pipe line.

Records available.—July 11 to December 31, 1905; May 23 to September 4, 1915.

Gage.—Vertical staff on wagon bridge on north side of ditch; read daily by R. H. Clark.

Discharge measurements.—Made from bridge or by wading.

Channel and control.—Clay soil; not likely to change during season.

Extremes of discharge.—Maximum stage recorded during year, 2.10 feet July 3, 6, and 7 (discharge, 100 second-feet). Canal dry at times.

Accuracy.—Records excellent.

Cooperation.—Field data furnished by State engineer of Oregon.

Farmers' ditch diverts water from right bank of Wallowa River in the NW. ¼ sec. 5, T. 3 S., R. 45 E., a few hundred feet below the Silver Lake ditch, and irrigates a crescent-shaped area of 4,563 acres lying east of Joseph under the Silver Lake ditch.

Discharge measurements of Farmers' ditch at Joseph, Oreg., during the year ending Sept. 30, 1915.

[Made by C. E. Stricklin.]

Date.	Gage height.	Discharge.	Date.	Gage height.	Discharge.
	Feet.	*Sec.-ft.*		*Feet.*	*Sec.-ft.*
May 24	0.75	12.6	July 27	1.60	58.5
June 22	1.90	79.7	Aug. 4	1.35	40.9
July 6	2.10	102			

Daily discharge, in second-feet, of Farmers' ditch at Joseph, Oreg., for the year ending Sept. 30, 1915.

Day.	May.	June.	July.	Aug.	Sept.	Day.	May.	June.	July.	Aug.	Sept.
1	......	3	42	77	6	16	......	58	73	22	......
2	......	3	90	67	6	17	......	73	73	22	......
3	......	3	100	62	6	18	......	77	41	22	......
4	......	3	90	50	6	19	......	81	35	22	......
5	......	3	90	50	......	20	......	81	45	22	......
6	......	14	100	44	......	21	......	81	52	19	......
7	......	22	100	22	......	22	......	81	62	19	......
8	......	22	90	22	......	23	16	81	62	3	......
9	......	22	90	20	......	24	14	81	69	3	......
10	......	38	90	21	......	25	13	22	54	3	......
11	......	44	90	22	......	26	13	77	54	3	......
12	......	44	90	22	......	27	43	81	51	3	......
13	......	44	62	22	......	28	90	90	81	3	......
14	......	48	62	22	......	29	9	45	81	4.5	......
15	......	51	65	22	......	30	3	0	79	6	......
						31	3	......	81	6	......

Note.—Daily discharge determined from a well-defined rating curve.

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[1] Called Farmers' and Citizens' ditch in U. S. Geol. Survey Water-Supply Paper 178, p. 164.

Monthly discharge of Farmers' ditch at Joseph, Oreg., for the year ending Sept. 30, 1915.

Month.	Discharge in second-feet.			Run-off (total in acre-feet).	Accuracy.
	Maximum.	Minimum.	Mean.		
May 23-31	90	3	22.7	405	A.
June	81	0	45.8	2,730	A.
July	100	35	72.4	4,450	A.
August	77	3	23.5	1,440	A.
September 1-4	6	6	6.0	48	A.
The period				9,070	

BIG BEND DITCH AT JOSEPH, OREG.

Location.—In the SE. ¼ sec. 30, T. 2 S., R. 45 E., at county bridge 100 feet west of the planing mill in Joseph, Wallowa County, about half a mile below the intake.

Records available.—July 12 to December 31, 1905; June 7 to August 21, 1915.

Gage.—Vertical staff nailed to cribbing on lower side of bridge. Gage reader, W. E. Leffel.

Discharge measurements.—Made in flume above gage.

Channel and control.—Gravelly; practically permanent.

Extremes of discharge.—Maximum stage recorded during year, 1.15 feet, June 23, 25-27, 29-30, July 1-2, and 4-7 (discharge, 101 second-feet); canal dry at times.

Accuracy.—Records good.

Cooperation.—Field data furnished by State Engineer of Oregon.

Big Bend ditch diverts from the right bank of Wallowa River in the NE. ¼ sec. 31, T. 2 S., R. 45 E., about 1½ miles below dam at Wallowa Lake, and irrigates 3,250 acres of land lying north and east of Joseph.

Discharge measurements of Big Bend ditch at Joseph, Oreg., during the year ending Sept. 30, 1915.

[Made by C. E. Stricklin.]

Date.	Gage height.	Discharge.	Date.	Gage height.	Discharge.
	Feet.	*Sec.-ft.*		*Feet.*	*Sec.-ft.*
June 15	0.32	18.3	July 7	1.15	103
22	1.10	94.0	26	.75	54.3

Daily discharge, in second-feet, of Big Bend ditch at Joseph, Oreg., for the year ending Sept. 30, 1915.

Day.	June.	July.	Aug.	Day.	June.	July.	Aug.	Day.	June.	July.	Aug.
1	......	101	40	11	82	40	8	21	94	12	[illegible]
2	......	101	32	12	94	50	12	22	94	12	......
3	......	94	24	13	5	40	8	23	101	24	......
4	......	101	8	14	40	60	8	24	94	65	......
5	......	101	8	15	8	24	70	25	101	65	......
6	......	101	8	16	24	32	8	26	101	50	......
7	70	101	8	17	60	32	8	27	101	45	......
8	70	94	8	18	94	60	12	28	94	70	......
9	70	94	8	19	94	32	8	29	101	70	......
10	82	82	8	20	94	32	8	30	101	50	......
								31	......	50	......

Note.—Discharge determined from a well-defined rating curve.

Monthly discharge of Big Bend ditch at Joseph, Oreg., for the year ending Sept. 30, 1915.

Month.	Discharge in second-feet.			Run-off (total in acre-feet).	Accuracy.
	Maximum.	Minimum.	Mean.		
June 7-30	101	5	77.9	3,710	B.
July	101	12	60.8	3,740	B.
August 1-21	70	8	14.8	617	B.
The period	....	....	....	8,070	

GRANGER DITCH AT JOSEPH, OREG.

Location.—In the SE. ¼ sec. 30, T. 2 S., R. 45 E., within city limits of Joseph. Wallowa County, at county bridge 75 feet west of Joseph planing mill and 20 feet east of the station on Big Bend ditch.

Records available.—July 12 to December 31, 1905; June 7 to August 28, 1915.

Gage.—Vertical staff nailed to cribbing on lower side of bridge. Gage read by W. E. Leffel.

Discharge measurements.—Made from bridge or by wading.

Channel and control.—Firm gravel; not likely to shift.

Extremes of discharge.—Maximum stage recorded during year, 4.70 feet June 25 and 26 (discharge, 257 second-feet). Canal dry at times.

Accuracy.—Records good.

Granger ditch diverts from the east side of Wallowa River in the NE. ¼ sec. 31, T. 2 S., R. 45 E., and irrigates 3,340 acres of land lying north and east of Joseph.

Discharge measurements of Granger ditch at Joseph, Oreg., during the year ending Sept. 30, 1915.

[Made by C. E. Stricklin.]

Date.	Gage height.	Discharge.	Date.	Gage height.	Discharge.
	Feet.	*Sec.-ft.*		*Feet.*	*Sec.-ft.*
Apr. 16	2.85	34.6	June 19	3.90	143
May 24	3.28	68.4	23	4.50	227

Daily discharge, in second feet, of Granger ditch at Joseph, Oreg., for the year ending Sept. 30, 1915.

Day.	June.	July.	Aug.	Day.	June.	July.	Aug.	Day.	June.	July.	Aug.
1	......	156	71	11	105	52	44	21	117	16	20
2	......	130	71	12	93	52	37	22	156	61	44
3	......	117	61	13	105	44	37	23	227	44	44
4	......	156	52	14	61	37	37	24	212	82	37
5	......	130	44	15	130	20	31	25	230	105	37
6	......	156	44	16	93	16	44	26	230	93	44
7	93	156	44	17	143	16	37	27	156	88	37
8	143	93	52	18	130	34	31	28	130	105	37
9	130	93	44	19	130	16	20	29	212	93	......
10	93	93	44	20	130	12	20	30	184	82	......
								31	......	93	......

Note.—Discharge, determined from a rating curve well defined between 25 and 250 second-feet.

Monthly discharge of Granger ditch at Joseph, Oreg., for the year ending Sept. 30, 1915.

Month.	Discharge in second-feet.			Run-off (total in acre-feet).	Accuracy.
	Maximum.	Minimum.	Mean.		
June 7-30	230	61	143	6,810	B.
July	156	12	78.7	4,840	B.
August 1-28	71	20	41.6	2,310	B.
The period				14,000	

HURRICANE CREEK NEAR JOSEPH, OREG.

Location.—In the NW. ¼ sec. 2, T. 3 S., R. 44 E., about 100 feet above the intake of Moonshine ditch, about 5 miles southwest of Joseph, Wallowa County.

Drainage area.—Not measured.

Records available.—April 27 to September 3, 1915.

Gage.—Vertical staff nailed to stump on south side of creek. Read three times a week by J. R. Kanaga.

Discharge measurements.—Made from footbridge at gage.

Channel and control.—Stream bed rocky; largest rocks were removed. One channel at all stages.

Extremes of discharge.—Maximum stage recorded during period of record, 1.90 feet April 30 (discharge, 238 second-feet); minimum stage recorded, 1.00 foot August 29 and September 1-2 (discharge, 40 second-feet); creek probably continued to fall.

Winter flow.—No records.

Diversions.—Station is above all ditches.

Regulation.—None.

Accuracy.—Stage-discharge relation not permanent. Poorly defined rating curve used April 9 to May 29; fairly well defined curve used May 30 to September 3. Daily discharge ascertained by applying daily gage heights to rating tables; computed only for days on which gage was read. Records fair.

Cooperation.—Field data furnished by State engineer of Oregon.

Discharge measurements of Hurricane Creek near Joseph, Oreg., during the year ending Sept. 30, 1915.

[Made by C. E. Stricklin.]

Date.	Gage height.	Discharge.	Date.	Gage height.	Discharge.	Date.	Gage height.	Discharge.
	Feet.	*Sec.-ft.*		*Feet.*	*Sec.-ft.*		*Feet.*	*Sec.-ft.*
April 27	1.38	72.5	June 26	1.52	155	Aug. 5	1.20	76.0
May 29	1.70	186	July 24	1.30	98.7	Sept. 3	1.00	40.0
June 18	1.68	181						

Daily discharge, in second-feet, of Hurricane Creek near Joseph, Oreg., for the year ending Sept. 30, 1915.

Day.	May.	June.	July.	Aug.	Sept.	Day.	May.	June.	July.	Aug.	Sept.
1				97	40	16	93	186	140		
2		212	163			17					
3					40	18		186	140	57	
4		186	163	77		19	78				
5	93			77		20		186		57	
6		163		77		21	186		117		
7	78		212			22				57	
8		163		77		23	212	163	117		
9	55		212			24			97		
10						25			97	57	
11		186	163	77		26	186	145			
12	145					27		186		57	
13		212		77		28	145		97		
14	108		140			29	186			40	
15				77		30	238	163	117		

Monthly discharge of Hurricane Creek, near Joseph, Oreg., for the year ending Sept. 30, 1915.

Month.	Discharge in second-feet.			Run-off (total in acre-feet).	Accuracy.
	Maximum.	Minimum.	Mean.		
May	238	55	139	8,550	C.
June	212	145	180	10,700	C.
July	212	97	141	8,670	C.
August	97	40	68.6	4,220	B.
September 13	40	40	40.0	238	B.
The period				32,100	

NOTE.—Average of discharge for days on which gage was read assumed to be mean discharge for the month.

LOSTINE RIVER NEAR LOSTINE, OREG.

LOCATION.—In the NW. ¼ sec. 34, T. 1 S., R. 43 E., about 4 miles south of Lostine, Wallowa County, about 10 miles above the mouth of the stream, and below all tributaries.

DRAINAGE AREA.—Not measured.

RECORDS AVAILABLE.—August 24, 1912, to March 31, 1914; April 23 to September 25, 1915.

GAGE.—Vertical staff on right bank; read once a day by Oscar Olson.

DISCHARGE MEASUREMENTS.—Made from wagon bridge 500 feet below gage or by wading.

CHANNEL AND CONTROL.—Gravel, sand, and boulders; may shift slightly; left bank likely to be overflowed.

EXTREMES OF DISCHARGE.—Maximum stage recorded during part of year for which record was taken, 3.30 feet May 28 and June 8 (discharge 780 second-feet); minimum stage recorded, 0.20 foot September 24–25 (discharge, 30 second-feet).

1912–1914 and 1915: Maximum stage recorded, 6.60 feet May 27, 1913 (discharge, 2,540 second-feet); minimum stage recorded, 0.02 foot February 11–13, 1913 (discharge, 26 second-feet).

WINTER FLOW.—Stage-discharge relation affected by ice during short periods of extremely cold weather.

DIVERSIONS.—Above all diversions except 2 small ditches taking water from Silver Creek, a tributary.

REGULATION.—None.

Accuracy.—Records somewhat uncertain, as no measurements were made during the year.

Cooperation.—Field data furnished by State engineer of Oregon.

Daily discharge, in second-feet, of Lostine River near Lostine, Oreg., for the year ending Sept. 30, 1915.

Day.	Apr.	May.	June.	July.	Aug.	Sept.	Day.	Apr.	May.	June.	July.	Aug.	Sept.
1	......	332	740	440	140	52	16	......	264	470	200	77	52
2	......	264	590	440	140	64	17	......	380	500	220	91	52
3	......	242	470	440	140	52	18	......	470	500	200	77	52
4	......	220	440	410	122	52	19	......	380	560	200	77	40
5	......	220	590	410	122	52	20	......	332	440	200	77	40
6	......	220	740	410	106	52	21	......	590	440	180	77	40
7	......	242	740	470	106	52	22	......	308	500	200	64	40
8	......	264	780	355	106	52	23	242	332	470	180	64	40
9	......	308	660	530	106	52	24	220	308	530	180	64	30
10	......	332	560	410	106	52	25	220	286	470	160	64	30
11	......	308	440	332	106	52	26	242	286	410	160	64	......
12	......	286	380	286	106	52	27	286	286	332	160	64	......
13	......	286	355	286	106	52	28	332	780	332	140	64	......
14	......	308	332	264	91	52	29	410	625	308	160	64	......
15	......	286	332	220	77	52	30	410	560	355	140	52	......
							31	......	560	......	160	64	......

Note.—Discharge determined from rating curve well defined by measurements made in 1912 to 1914 but somewhat uncertain at low water for 1915.

Monthly discharge of Lostine River near Lostine, Oreg., for the year ending Sept. 30, 1915.

Month.	Discharge in second-feet.			Run-off (total in acre-feet).	Accuracy.
	Maximum.	Minimum.	Mean.		
April 23-30	410	220	295	4,680	C.
May	780	220	350	21,500	C.
June	780	308	492	29,300	C.
July	530	140	276	17,000	C.
August	140	52	89.8	5,520	C.
September 1-25	64	30	48.3	2,400	C.
The period	....	....	....	80,400	

BEAR CREEK NEAR WALLOWA, OREG.

Location.—In the NW. ¼ sec. 3, T. 1 S., R. 42 E., at a private wagon bridge 5 miles southwest of Wallowa, Wallowa County.

Drainage area.—Not measured.

Records available.—April 13 to September 16, 1915.

Gage.—Vertical staff on cribbing on lower left side of bridge; read daily by John Huber.

Discharge measurements.—Made from wagon bridge at gage.

Channel and control.—Stream bed rocky; probably permanent.

Extremes of discharge.—Maximum stage recorded during period of record, 2.90 feet May 28 (discharge, 755 second-feet); minimum stage observed, 0.60 foot (discharge, 10 second-feet).

Winter flow. —No record.

Diversions.—Two small ditches, with a combined capacity of about 3 second-feet, divert water above the gage.

Regulation.—None.

Accuracy.—Stage-discharge relation practically permanent. Rating curve well defined between 10 and 500 second-feet. Daily discharge ascertained by applying gage heights to rating table. Records good.

Cooperation.—Field data furnished by State engineer of Oregon.

Discharge measurements of Bear Creek near Wallowa, Oreg., during the year ending Sept. 30, 1915.

[Made by C. E. Stricklin.]

Date.	Gage height.	Discharge.	Date.	Gage height.	Discharge.
	Feet.	*Sec.-ft.*		*Feet.*	*Sec.-ft.*
Apr. 13	2.00	241	July 24	0.95	38.2
13	2.00	264	Aug. 23	.62	11.9
May 31	2.40	426			

Daily discharge, in second-feet, of Bear Creek near Wallowa, Oreg., for the year ending Sept. 30, 1915.

Day.	Apr.	May.	June.	July.	Aug.	Sept.	Day.	Apr.	May.	June.	July.	Aug.	Sept.
1	......	185	480	138	34	10	16	213	281	213	68	19	14
2	......	185	424	128	32	10	17	185	424	281	62	23	......
3	......	172	398	128	30	10	18	281	452	185	62	17	......
4	......	185	424	118	32	10	19	372	398	160	46	17	......
5	......	160	372	128	30	10	20	245	424	172	46	17	......
6	......	160	480	118	25	10	21	324	372	160	68	16	......
7	......	160	424	118	23	10	22	213	424	185	55	14	......
8	......	185	424	122	25	10	23	185	281	160	44	11	......
9	......	213	245	118	23	10	24	160	324	160	44	11	......
10	......	229	213	109	23	10	25	185	281	172	34	11	......
11	......	245	185	109	23	10	26	160	281	138	30	11	......
12	......	213	185	104	21	10	27	213	245	128	34	11	......
13	245	245	185	100	21	10	28	199	755	118	30	10	......
14	213	324	213	83	19	11	29	372	605	128	30	11	......
15	185	245	185	76	19	11	30	372	424	122	34	10	......
							31	......	372	......	44	10	......

Monthly discharge of Bear Creek near Wallowa, Oreg., for the year ending Sept. 30, 1915.

Month.	Discharge in second-feet.			Run-off (total in acre-feet).	Accuracy.
	Maximum.	Minimum.	Mean.		
April 13-30	372	160	240	8,570	B.
May	755	160	305	18,800	B.
June	480	118	244	14,500	B.
July	138	30	78.3	4,810	B.
August	34	10	19.3	1,190	B.
September 1-16	14	10	10.4	330	B.
The period				48,200	

CLEARWATER RIVER AT KAMIAH, IDAHO.

Location.—In sec. 1, T. 33 N., R. 3 E., at the toll bridge in the town of Kamiah, 6 miles below the mouth of South Fork of Clearwater River, in Lewis County.

Drainage area.—4,850 square miles (measured on General Land Office map, edition of 1909).

Records available.—August 20, 1910, to September 30, 1915.

Gage.—Since May 30, 1911, chain gage attached to downstream handrail of toll bridge; prior to that date gage was painted on lower steel caisson of first pier from left abutment, the datum being 0.06 foot lower than that of present gage. Gage read by Mrs. J. W. McGuire.

Discharge measurements.—Made from downstream side of toll bridge.

Channel and control.—Stream bed at gage and control consists of heavy boulders and gravel; probably permanent. One channel at low water, two channels between gage heights about 5 and 8 feet, and one channel above gage height 8 feet. -

Extremes of discharge.—Maximum stage recorded during the year, 9.8 feet May 19 (discharge, 28,200 second-feet); minimum stage recorded, 2.2 feet January 26 (discharge, 1,130 second-feet).

1910–1915: Maximum stage recorded, 16.1 feet May 26, 1913 (discharge, 76,600 second-feet); minimum stage recorded, 2.0 feet December 5–6, 1913 (discharge, 950 second-feet).

Winter flow.—Stage-discharge relation not seriously affected by ice; open-channel rating curve assumed applicable.

Diversions.—Several small ditches divert water for irrigation above station.

Regulation.—None.

Accuracy.—Stage-discharge relation practically permanent; not affected by ice during year. Rating curve well defined between 1,000 and 50,000 second-feet. Gage read to tenths once daily. Daily discharge ascertained by applying daily gage heights to rating table. Records excellent.

Cooperation.—Gage-height record furnished by United States Weather Bureau.

The following discharge measurement was made by C. O. Brown.

May 9, 1915: Gage height, 6.20 feet; discharge, 10,300 second-feet.

Daily discharge, in second-feet, of Clearwater River at Kamiah, Idaho, for the year ending Sept. 30, 1915.

Day.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.
1	1,660	5,510	3,630	2,200	2,050	2,350	6,870	15,200	18,500	8,070	4,510	1,430
2	1,780	5,000	2,860	2,050	2,510	2,350	6,590	13,400	20,600	7,760	4,510	1,540
3	2,350	5,510	3,430	2,050	2,510	2,510	8,390	13,000	18,000	7,460	4,060	1,660
4	2,680	7,160	3,630	2,050	2,350	2,200	12,100	10,900	17,500	7,460	3,430	1,780
5	2,860	6,040	3,230	2,200	2,200	2,510	10,900	10,100	17,000	6,870	3,230	1,780
6	4,060	5,000	3,230	1,780	1,910	2,510	9,770	9,410	16,600	6,590	3,230	1,430
7	3,430	4,510	3,040	1,910	2,050	2,350	10,100	9,410	15,200	6,590	3,040	1,430
8	2,860	4,060	2,050	2,050	1,910	2,350	9,770	9,770	14,300	9,060	2,860	1,320
9	2,510	3,840	1,780	2,050	1,910	2,050	8,720	9,770	13,800	8,070	2,680	1,430
10	2,510	6,310	1,660	2,050	2,510	2,200	8,390	10,500	13,000	10,900	2,680	1,780
11	3,040	6,870	1,660	1,910	2,350	2,200	8,390	11,700	12,500	8,390	2,680	1,780
12	3,230	8,390	2,050	1,910	2,200	2,350	9,770	10,100	15,600	7,160	2,200	1,910
13	3,040	6,870	2,200	1,910	2,200	2,510	11,700	9,770	16,100	6,590	2,200	2,200
14	2,860	8,390	1,540	1,910	1,910	2,680	13,800	10,500	15,600	7,160	2,350	2,050
15	3,430	7,160	1,220	2,050	1,910	3,230	12,100	12,100	14,300	6,870	2,510	2,050
16	4,510	6,310	1,220	1,910	1,910	4,280	13,000	10,500	13,400	6,310	2,350	1,910
17	4,750	5,250	1,540	1,780	1,910	4,060	13,800	9,770	13,000	7,160	2,350	1,780
18	5,000	5,510	1,430	1,780	2,350	3,840	15,600	18,500	12,500	8,390	2,050	1,660
19	6,040	4,750	1,430	1,780	2,200	4,060	17,000	28,200	12,100	6,870	2,200	1,430
20	6,310	4,510	1,780	1,780	2,510	3,630	19,000	24,000	13,000	6,590	2,050	1,430
21	6,310	4,510	1,780	1,780	2,510	3,430	19,500	21,700	12,100	5,770	2,050	1,540
22	5,510	4,280	1,780	1,660	2,350	3,840	17,500	21,100	10,500	5,510	1,910	1,430
23	5,250	4,510	2,050	1,320	2,350	4,750	15,200	20,000	10,100	5,250	1,660	1,540
24	4,510	4,510	2,050	1,430	2,350	6,590	14,300	19,000	9,410	4,750	1,540	1,320
25	4,280	4,060	2,200	1,320	2,510	7,460	13,800	18,500	9,060	4,510	1,540	1,430
26	4,060	4,060	2,680	1,130	2,680	6,310	13,000	18,000	12,500	4,280	1,540	1,320
27	4,060	4,060	2,680	1,430	2,510	5,770	13,000	17,000	10,900	4,280	1,430	1,660
28	3,630	3,840	3,040	1,540	2,200	5,770	14,300	18,500	9,770	4,750	1,430	2,350
29	3,430	4,060	2,680	1,780	....	6,310	15,200	22,800	8,720	4,280	1,430	2,200
30	4,510	4,060	2,860	1,910	....	6,870	17,000	20,600	8,390	4,510	1,540	1,910
31	5,000	....	2,350	2,050	....	7,160	....	18,500	....	4,510	1,320	....

Monthly discharge of Clearwater River at Kamiah, Idaho, for the year ending Sept. 30, 1915.

[Drainage area, 4,850 square miles.]

Month.	Discharge in second-feet.				Run-off.		Accuracy.
	Maximum.	Minimum.	Mean.	Per square mile.	Depth in inches on drainage area.	Total in acre-feet.	
October	6,310	1,660	3,850	0.794	0.92	237,000	A.
November	8,390	3,840	5,300	1.09	1.22	315,000	A.
December	3,630	1,220	2,280	.470	.54	140,000	A.
January	2,200	1,130	1,820	.375	.43	112,000	A.
February	2,680	1,910	2,240	.462	.48	124,000	A.
March	7,460	2,050	3,890	.802	.92	239,000	A.
April	19,500	6,590	12,600	2.60	2.90	750,000	A.
May	28,200	9,410	15,200	3.13	3.61	935,000	A.
June	20,600	8,390	13,500	2.78	3.10	803,000	A.
July	10,900	4,280	6,540	1.35	1.56	402,000	A.
August	4,510	1,320	2,410	.497	.57	148,000	A.
September	2,350	1,320	1,680	.346	.39	100,000	A.
The year	28,200	1,130	5,950	1.23	16.64	4,300,000	

SOUTH FORK OF CLEARWATER RIVER NEAR GRANGEVILLE, IDAHO.

Location.—In the SE. ¼ NW. ¼ sec. 30, T. 30 N., R. 4 E., below power house of Grangeville Electric Light & Power Co., 6 miles east of Mount Idaho, 10 miles southeast of Grangeville, and 19 miles above mouth of river; in Idaho County.

Drainage area.—940 square miles (measured on General Land Office map, edition of 1909).

Records available.—November 14, 1910, to July 31, 1911; October 9 to November 18, 1911; January 4, 1912, to September 30, 1915.

Gage.—Since May 30, 1912, vertical staff on right bank, in two sections: Lower section anchored to rock point 75 feet below power house; upper section nailed to vertical timbers in tailrace of power plant at datum 0.22 foot higher than lower section, the difference representing fall of river between the two sections at stage 4.0 feet. Gages previously used as follows: November 14, 1910, to November 1, 1911, vertical staff at same site as lower section of present gage but at datum 1.2 feet higher; November 2, 1911, to May 29, 1912, vertical staff in two sections at same site and datum as present lower section. Gage read by John T. Kelly.

Discharge measurements.—Made from cable just above power house or by wading. Two measurements are necessary, one of river above power house and one of intake flume; the sum represents flow past gage.

Channel and control.—Stream bed at gage and control composed of large boulders; not likely to shift except at high stages. Channel curved at gage; gradient steep. Left bank subject to overflow during floods.

Extremes of discharge.—Maximum stage recorded during year, 6.75 feet at 5 p. m., May 19 (discharge, 4.200 second-feet); minimum discharge estimated at 114 second-feet December 16–25 (stage-discharge relation affected by ice).

1910–1915: Maximum stage recorded, 9.7 feet May 30, 1912 (discharge, 9,380 second-feet); minimum discharge December 16–25, 1914.

Winter flow.—Stage-discharge relation seriously affected by ice; flow estimated from discharge measurements, observer's notes, and weather records.

Diversions.—None.

Regulation.—Operation of power plant causes slight variations in stage.

Accuracy.—Stage-discharge relation practically permanent; affected by ice December 9 to January 31. Rating curve well defined between 150 and 3,500 second-feet. Gage read to half-tenths twice daily. Daily discharge, except for ice period, ascertained by applying mean daily gage heights to rating table. Records excellent except for December and January, for which they are poor.

Cooperation.—Gage-height record furnished by United States Forest Service.

The following discharge measurement was made by C. O. Brown:

May 8, 1915: Gage height, 3.40 feet; discharge, 798 second-feet.

Daily discharge, in second-feet, of South Fork of Clearwater River near Grangeville, Idaho, for the year ending Sept. 30, 1915.

Day.	Oct.	Nov.	Dec.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.
1	213	485	252	252	221	955	1,100	3,590	955	591	195
2	232	485	213	244	213	955	1,100	3,470	955	564	195
3	435	386	294	244	221	1,580	1,100	3,110	890	511	195
4	460	386	252	213	213	1,580	1,100	2,990	890	460	206
5	435	339	252	213	232	1,400	955	2,990	765	435	206
6	564	339	221	206	221	1,240	890	2,770	955	410	206
7	485	339	232	206	213	1,400	825	2,440	1,670	386	195
8	386	294	213	206	213	1,400	825	2,340	1,400	386	177
9	339	294	195	213	213	1,240	825	2,140	1,760	386	177
10	339	294	....	213	213	1,240	890	1,940	1,580	362	177
11	339	294	....	206	221	1,240	890	2,240	1,240	339	244
12	435	435	....	213	232	1,320	890	2,770	1,100	316	316
13	386	591	....	213	294	1,850	825	2,550	1,020	316	435
14	386	511	....	221	294	1,760	955	2,340	1,020	316	339
15	410	410	....	221	435	1,580	1,100	2,340	1,100	294	316
16	386	260	....	195	485	1,490	955	2,140	1,020	294	294
17	386	362	....	206	460	1,490	890	1,940	1,400	316	252
18	386	232	....	213	537	1,490	2,990	1,940	1,100	294	221
19	435	294	....	206	485	1,580	4,130	1,940	955	273	213
20	591	339	....	206	435	1,580	3,710	1,940	825	252	206
21	485	316	....	221	485	1,490	3,470	1,670	765	252	195
22	460	273	....	213	591	1,320	3,470	1,490	765	252	184
23	435	294	....	213	705	1,320	3,110	1,400	705	252	184
24	386	339	....	206	1,020	1,320	2,770	1,400	619	244	184
25	339	294	....	213	955	1,240	2,770	1,400	591	232	184
26	339	294	....	221	825	1,170	2,660	1,580	591	232	221
27	339	294	....	213	765	1,170	2,550	1,320	564	213	386
28	316	316	....	206	765	1,100	3,710	1,240	647	213	339
29	316	294	....	....	955	1,100	3,990	1,100	705	195	244
30	294	273	....	....	955	1,100	3,350	1,020	647	195	213
31	485	....	....	....	955	....	3,110	....	591	195	....

Note.—Discharge estimated, because of ice, from observer's notes and weather records, as follows: Dec. 10–15, 144 second-feet; Dec. 16–25, 114 second-feet; Dec. 26–31, 132 second-feet; Jan. 1–5, 123 second-feet; Jan. 6–10, 138 second-feet; Jan. 11–20, 167 second-feet; Jan. 21–25, 141 second-feet; Jan. 26–31, 167 second-feet.

Monthly discharge of South Fork of Clearwater River near Grangeville, Idaho, for the year ending Sept. 30, 1915.

[Drainage area, 940 square miles.]

Month.	Discharge in second-feet.			Run-off (total in acre-feet).	Accuracy.
	Maximum.	Minimum.	Mean.		
October	591	213	394	24,200	A.
November	591	232	344	20,500	A.
December	294	....	159	9,780	D.
January	....	....	151	9,280	D.
February	252	195	215	11,900	A.
March	1,020	213	485	29,800	A.
April	1,850	955	1,360	80,900	A.
May	4,130	825	2,000	123,000	A.
June	3,590	1,020	2,120	126,000	A.
July	1,760	564	961	59,100	A.
August	591	195	322	19,800	A.
September	435	177	237	14,100	A.
The year	4,130	....	729	528,000	

TUCANNON RIVER NEAR POMEROY, WASH.

Location.—In sec. 13, T. 11 N., R. 40 E., at highway bridge at the abandoned post office of Marengo, 9 miles southwest of Pomeroy, in Columbia County, 17½ miles north of Dayton, and 14 miles above Petaha Creek.

Drainage area.—Not measured.

Records available.—August 31, 1913, to June 30, 1915, when station was discontinued.

Gage.—Vertical staff in two sections at highway bridge. Lower section on pile 3 feet from left abutment; upper section on left abutment; read by William Brockman.

Discharge measurements.—Made by wading near gage.

Channel and control.—Bed of stream composed of gravel. Control formed by riffle 75 feet below gage; shifting at high water. Banks not subject to overflow. Stage of zero flow, determined September 29, 1915, gage height 0.3 foot.

Extremes of discharge.—Maximum discharge during the period October 1, 1914, to June 30, 1915, estimated at 285 second-feet May 20 and 21, by hydrograph comparison with record of Tucannon River near Starbuck; minimum stage recorded, 1.20 feet at 7.30 a. m. December 24 (discharge, 25 second-feet).

1913–1915: Maximum stage recorded, 2.55 feet at 4.40 p. m. April 15, 1914 (discharge, 370 second-feet); minimum stage recorded December 24, 1914.

Winter flow.—Stage-discharge relation affected by ice for short periods during severe winters.

Diversions.—Several small diversions for irrigation above station.

Regulation.—None.

Accuracy.—Stage-discharge relation not permanent; affected by ice December 19–23 and 28, 1914. Rating curve, well defined below 200 second-feet, used August 31, 1913, to April 15, 1914; rating curve well defined throughout used April 15, 1914, to June 30, 1915. Gage read to half-tenths twice daily from August 31, 1913, to July 25, 1914, and to hundredths twice daily from July 26, 1914, to June 30, 1915. Observer's record doubtful March 17 to April 2 and May 19–21, 1915. Daily discharge ascertained by applying mean daily gage heights to rating tables, except for periods of doubtful gage readings and ice effect. Records good except for periods of estimated discharge. Determinations of discharge August 31, 1913, to September 30, 1914, supersede those published in Water-Supply Paper 393.

Discharge measurements of Tucannon River near Pomeroy, Wash., during the year ending Sept. 30, 1915.

[Made by C. O. Brown.]

Date.	Gage height.	Discharge.	Date.	Gage height.	Discharge.	Date.	Gage height.	Discharge.
	Feet.	*Sec.-ft.*		*Feet.*	*Sec.-ft.*		*Feet.*	*Sec.-ft.*
Nov. 4	1.63	72.8	Feb. 9	1.73	102	Sept. 29	1.49	54.2
Dec. 19	[a]1.64	44.3	May 20	2.52	310			

[a] Stage-discharge relation affected by ice.

Daily discharge, in second-feet, of Tucannon River near Pomeroy, Wash., for the period Aug. 31, 1913, to June 30, 1915.

Day.	Aug.	Sept.	Day.	Aug.	Sept.	Day.	Aug.	Sept.
1913.			1913.			1913.		
1		70	11		70	21		78
2		70	12		70	22		88
3		70	13		70	23		88
4		82	14		70	24		78
5		75	15		70	25		70
6		70	16		70	26		70
7		70	17		70	27		70
8		78	18		70	28		70
9		70	19		70	29		97
10		70	20		78	30		101
						31	72	

Day.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.
1913-14.												
1	78	101	78	97	98	244	137	165	138	74	56	55
2	70	97	78	97	108	274	137	187	140	72	56	53
3	70	97	78	97	93	259	142	187	160	70	55	55
4	78	97	78	88	114	228	184	202	138	89	56	53
5	78	88	78	88	97	198	228	187	138	87	56	55
6	78	78	78	88	76	198	290	182	135	76	55	56
7	97	78	78	88	114	198	274	174	130	76	55	62
8	108	78	78	88	99	198	259	216	124	83	55	69
9	108	78	78	88	93	213	259	231	124	69	56	69
10	78	78	78	78	97	244	259	231	121	69	55	63
11	78	78	78	78	97	228	244	216	114	66	55	69
12	88	78	78	78	99	198	259	202	108	64	56	69
13	78	78	78	78	101	198	274	216	108	95	55	69
14	82	78	78	78	101	198	306	307	106	91	53	69
15	78	78	78	78	114	228	354	261	104	72	53	87
16	78	78	78	88	110	244	307	261	101	70	55	87
17	78	78	78	78	114	228	261	246	99	69	55	87
18	78	78	78	78	110	228	246	246	91	66	55	89
19	70	78	78	78	116	228	246	216	91	59	56	82
20	70	78	78	88	120	228	276	202	87	59	56	87
21	70	78	78	82	130	213	246	187	87	58	55	71
22	70	78	78	88	169	198	231	202	89	56	53	55
23	78	78	78	97	198	198	216	216	82	56	53	64
24	78	78	78	97	198	195	216	202	82	56	55	62
25	78	78	78	88	228	184	187	187	89	56	48	63
26	97	78	78	88	213	166	187	182	104	55	53	62
27	97	78	78	88	198	156	176	174	93	56	53	69
28	88	78	78	88	213	147	160	158	93	56	55	69
29	88	78	78	88		137	160	148	87	56	55	69
30	97	78	88	88		142	150	135	83	55	55	69
31	108		97	88		142		135		56	55	

Daily discharge, in second-feet, of Tucannon River near Pomeroy, Wash., for the period Aug. 31, 1913, to June 30, 1915—Continued.

Day.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May.	June.
1914-15.									
1	67	72	76	72	216	99	....	160	150
2	72	85	76	72	112	95	....	155	142
3	72	85	80	72	130	91	246	150	130
4	69	80	76	76	99	95	216	150	119
5	69	80	76	72	102	93	216	150	110
6	69	87	78	72	104	91	216	160	108
7	67	80	80	69	95	91	187	152	102
8	62	76	80	74	95	89	187	148	97
9	56	76	80	76	95	89	187	160	93
10	62	80	76	70	99	87	155	187	99
11	85	80	69	69	102	87	150	182	117
12	85	99	66	69	104	87	174	187	110
13	72	117	64	78	99	89	187	202	102
14	72	112	46	76	91	91	174	216	95
15	72	99	53	80	91	124	171	231	91
16	70	102	56	70	87	145	150	231	87
17	70	91	50	70	87	....	160	231	89
18	72	85	47	70	91	....	160	261	83
19	87	80	44	69	95	....	165	....	80
20	85	80	....	69	104	....	165	....	83
21	85	82	....	67	108	....	171	....	83
22	72	80	....	64	108	....	155	276	72
23	80	80	....	58	108	....	150	246	72
24	72	78	27	55	108	....	148	231	72
25	72	78	35	53	102	....	145	216	76
26	70	80	39	51	102	....	135	187	78
27	70	80	53	53	99	....	135	168	76
28	70	80	68	82	99	....	135	187	69
29	70	80	83	72	....	....	155	176	69
30	70	78	80	72	....	....	160	165	66
31	70	....	72	69	....	....	....	155	....

NOTE.—Gage not read, discharge interpolated, Feb. 1 and June 14–16, 1914. Stage-discharge relation affected by ice Dec. 19–23 and 28, 1914; discharge Dec. 19 determined from discharge measurement, Dec. 20–23 estimated at 35 second-feet Dec. 28 interpolated. Observer's record doubtful Mar. 17 to Apr. 2 and May 19–21, 1915; discharge estimated by hydrograph comparison with record of flow Tucannon River near Starbuck as follows: Mar. 17–31, 155 second-feet; Apr. 1–2, 185 second-feet; and May 19–21, 280 second-feet.

Monthly discharge of Tucannon River near Pomeroy, Wash., for 1913–1915.

Month.	Discharge in second-feet.			Run-off (total in acre-feet).	Accuracy.
	Maximum.	Minimum.	Mean.		
1913.					
September	101	70	74.8	4,450	B.
1913-14.					
October	108	70	82.9	5,100	B.
November	101	78	81.0	4,820	B.
December	97	78	78.9	4,850	B.
January	97	78	86.4	5,310	B.
February	228	76	129	7,160	A.
March	274	137	204	12,500	A.
April	354	137	229	13,600	A.
May	307	135	202	12,400	A.
June	160	82	108	6,430	A.
July	95	55	67.5	4,150	A.
August	56	48	54.6	3,360	B.
September	89	53	67.9	4,040	B.
The year	354	48	116	83,700	
1914-15.					
October	87	56	72.1	4,430	B.
November	117	72	84.7	5,040	B.
December	99	27	60.3	3,710	B.
January	82	51	69.1	4,250	B.
February	216	87	105	5,830	B.
March	....	87	125	7,690	C.
April	246	135	171	10,200	B.
May	....	148	199	12,200	B.
June	150	66	94.0	5,590	B.
The period	....	27	109	58,900	

TUCANNON RIVER NEAR STARBUCK, WASH.

Location.—In sec. 23, T. 12 N., R. 38 E., half a mile below mouth of Petaha Creek, and 6 miles east of Starbuck, Columbia County.

Drainage area.—Not measured.

Records available.—November 8, 1914, to September 30, 1915.

Gage.—Inclined staff in two sections on left bank, 1,000 feet above observer's house; read by Wesley Martin.

Discharge measurements.—Made by wading or from a bridge 1 mile below gage.

Channel and control.—Channel straight for 100 feet above and below gage. Bed composed of solid rock. Banks made up of light soil; wooded; left bank high; right is overflowed at gage height 5.5 feet. Control is a vertical drop of 2 feet over solid rock, 100 feet below gage. Stage of zero flow, determined September 28, 1915, gage height 0.6 ± 0.1 foot.

Extremes of discharge.—Maximum stage recorded during year, 4.2 feet on morning of February 1 (discharge, 970 second-feet); minimum stage, 1.60 feet August 24–31 (discharge, 39 second-feet).

Winter flow.—Stage-discharge relation seriously affected by ice; flow estimated from discharge measurements, observer's notes, and weather records.

Diversions.—Many small irrigation ditches divert water above gage—probably about 10 per cent of natural flow during July and August. A large part of the diverted water returns to the river above the gage in the form of seepage.

Regulation.—None.

Accuracy.—Stage-discharge relation not permanent; changed by construction of a low wing dam during August, 1915, and affected by ice during December and January. Two rating curves used, each well defined below 600 second-feet, one applicable November 8 to July 31, the other August 16 to September 30. Gage read to hundredths twice daily. Daily discharge ascertained by applying gage heights to rating table; shifting-control method used August 1–15. Records excellent except for December, January, and August, for which they are good.

Discharge measurements of Tucannon River near Starbuck, Wash., during the year ending Sept. 30, 1915.

[Made by C. O. Brown.]

Date.	Gage height.	Discharge.	Date.	Gage height.	Discharge.	Date.	Gage height.	Discharge.
	Feet.	*Sec. ft.*		*Feet.*	*Sec. ft.*		*Feet.*	*Sec. ft.*
Nov. 9	1.88	85	Feb. 9	2.10	126	May 19	2.78	24
Dec. 18	[a] 2.51	48	May 2	2.28	158	Sept. 28	1.72	5
Feb. 8	2.11	134						

[a] Stage-discharge relation affected by ice.

Daily discharge, in second-feet, of Tucannon River near Starbuck, Wash., for the year ending Sept. 30, 1915.

Day.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.
1	......	85	89	341	105	196	162	184	70	52	41
2	......	89	89	680	102	184	162	142	69	53	41
3	......	85	89	290	105	378	162	142	65	52	41
4	......	89	109	208	112	290	162	132	65	51	42
5	......	86	91	142	112	220	162	132	64	50	41
6	......	82	99	132	109	208	152	132	68	48	41
7	......	76	86	132	105	208	152	132	68	46	42
8	85	78	99	123	105	196	152	132	70	46	43
9	86	78	100	123	105	184	162	123	70	46	43
10	78	75	85	114	102	162	173	123	70	46	45
11	95	70	83	123	102	162	184	132	70	45	48
12	109	68	86	114	102	173	196	142	70	45	60
13	109	64	95	114	100	184	233	132	68	44	66
14	123	61	123	112	102	184	233	123	67	43	62
15	102	56	112	107	114	162	233	123	68	42	61
16	99	54	86	102	142	162	233	114	68	41	59
17	102	52	88	102	152	152	246	105	67	41	59
18	102	48	86	114	152	162	260	105	65	41	57
19	91	45	85	123	142	162	275	97	65	41	55
20	89	44	83	123	142	162	290	92	63	40	53
21	92	45	82	123	142	162	290	89	63	40	49
22	89	45	81	123	142	162	290	86	61	40	49
23	89	46	79	123	142	152	260	91	59	40	51
24	89	47	78	114	152	152	246	92	56	39	51
25	89	48	78	114	162	152	233	91	55	39	51
26	89	52	76	112	162	142	208	89	54	39	51
27	85	61	76	109	162	142	208	86	54	39	51
28	85	73	81	107	162	142	208	83	53	39	51
29	89	91	97	......	173	142	196	78	52	39	51
30	85	86	134	......	184	173	196	74	52	39	51
31	......	92	175	......	208	......	184	......	52	39	......

NOTE.—Discharge estimated, because of ice, Dec. 11-29 and Jan. 11-30.

Monthly discharge of Tucannon River near Starbuck, Wash., for the year ending Sept. 30, 1915.

Month.	Discharge in second-feet.			Run-off (total in acre-feet).	Accuracy.
	Maximum.	Minimum.	Mean.		
November 8-30	123	78	93.5	4,270	A.
December	92	44	66.8	4,110	B.
January	175	76	93.5	5,750	B.
February	680	102	155	8,610	A.
March	208	100	132	8,120	A.
April	378	142	180	10,700	A.
May	290	152	210	12,900	A.
June	184	74	113	6,720	A.
July	70	52	63.3	3,890	A.
August	53	39	43.4	2,670	B.
September	66	41	50.2	2,990	A.
The period	....	....	....	70,700	

PALOUSE RIVER NEAR POTLATCH, IDAHO.

Location.—A quarter of a mile above Kennedy Ford, three-fourths mile below Deep Creek, and 3½ miles below Potlatch, in Latah County.

Drainage area.—Not measured.

Records available.—October 1, 1914, to September 30, 1915.

Gage.—Stevens water-stage recorder on right bank a quarter of a mile above Kennedy Ford. Floyd Vowell, observer.

Discharge measurements.—Made from bridge three-fourths mile below gage or by wading.

Channel and control.—Composed of boulders and solid rock, practically permanent. At extremely high stages water flows around gage on right bank.

Extreme of discharge.—Maximum stage, from water-stage recorder, 10.8 feet at 1 a. m., May 21 (discharge, 2,780 second-feet); minimum stage from recorder, 0.02 at 3 a. m., December 21 (discharge estimated at 1.0 second-foot).

Winter flow.—Stage-discharge relation seriously affected by ice. Flow estimated from discharge measurements, observer's notes, and weather records.

Diversions.—None.

Regulation.—Flow affected by regulation of Potlatch Lumber Co.'s reservoir 5 miles above station.

Accuracy.—Stage-discharge relation permanent, affected by ice December 11 to February 4. Rating curve well defined between 40 and 5,200 second-feet. Daily discharge ascertained by use of discharge integrator. Records excellent except for ice periods and periods of very low discharge.

Discharge measurements of Palouse River near Potlatch, Idaho, during the year ending Sept. 30, 1915.

Date.	Made by—	Gage height.	Discharge.	Date.	Made by—	Gage height.	Discharge.
		Feet.	*Sec.-ft.*			*Feet.*	*Sec.-ft.*
Oct. 19	C. O. Brown	0.65	18.4	Feb. 27	C. O. Brown	1.46	101
21	do	2.15	166	Apr. 14	do	2.63	306
21	do	1.16	51.8	May 22	do	5.35	908
23	do	.53	14.3	23	do	4.97	790
23	do	.38	7.1	24	do	4.38	670
Jan. 28	do[a]	.64	9.9	24	do	3.97	585
29	do[a]	.77	11.7	July 29	do	.29	5.6
29	do[a]	.92	22.9	30	do	.28	5.5
Feb. 24	do	1.58	128	30	do	.27	5.2
26	do	1.67	133	Sept. 8	Parker and Richardson.	.20	2.7

[a] Stage-discharge relation affected by ice.

Daily discharge, in second-feet, of Palouse River near Potlatch, Idaho, for the year ending Sept. 30, 1915.

Day.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.
1	......	17.0	22	13	22	128	765	112	343	12.0	12.8	5.3
2	......	12.0	26	16	33	150	650	198	233	12.2	10.4	5.0
3	......	10.5	19.0	18	40	156	678	176	186	15.0	13.0	3.9
4	......	16.5	18.5	18	35	259	737	187	306	15.0	8.4	4.2
5	......	18.0	18.5	18	33	220	558	140	168	19.0	9.2	4.2
6	......	20	19.0	17	48	132	448	116	92	35	10.2	3.9
7	......	70	18.0	14	68	181	428	107	90	23	8.0	3.6
8	......	148	18.0	12	82	221	390	96	94	14.9	14.2	3.2
9	......	14.0	18.5	9	82	166	300	104	80	24	4.9	3.2
10	......	14.4	18.0	9	144	164	237	92	91	33	7.9	4.2
11	......	13.6	20	10	148	172	238	132	123	33	8.2	3.2
12	......	16.0	14	12	90	179	247	118	117	25	9.2	4.6
13	......	24.0	10	12	62	199	250	102	106	28	10.2	5.0
14	......	41	14	11	60	234	285	130	88	28	9.1	3.4
15	......	122	10	10	53	266	255	94	68	19.0	10.8	7.3
16	......	42	14	9	50	753	219	83	82	14.0	6.0	5.2
17	......	60	10	13	66	584	220	84	56	6.7	6.7	6.9
18	......	73	15	17	94	501	223	333	46	7.1	8.8	7.0
19	......	50	10	10	123	516	188	1,820	44	20	6.9	7.2
20	......	38	18	14	126	433	164	2,580	47	18.0	6.9	8.5
21	......	28	8	9	136	368	138	1,670	47	19.0	6.4	4.8
22	......	14.4	10	9	145	355	100	926	43	18.5	9.7	5.6
23	......	16.0	9	16	123	371	122	816	40	15.5	6.1	6.2
24	10.0	16.5	9	10	120	422	167	616	40	16.0	6.6	7.9
25	11.5	16.0	10	12	163	405	112	574	38	18.0	6.9	6.0
26	8.8	17.5	11	11	136	336	98	504	37	14.5	6.0	6.6
27	10.0	16.0	8	10	120	297	79	426	38	17.0	5.3	7.1
28	10.1	17.0	7	13	128	368	76	425	24	12.3	6.7	7.1
29	7.6	17.0	8	16	......	296	80	458	10.9	15.0	7.6	6.3
30	9.5	18.0	10	16	......	1,010	100	322	13.7	12.8	5.2	6.2
31	11.6	......	13	17	......	1,030	......	320	......	11.4	4.4	......

NOTE.—Discharge Oct. 1-23 estimated 8 second-feet by comparison with record at Hooper station. Discharge Dec. 11 to Feb. 4 estimated, because of ice, from observer's notes and weather records.

Monthly discharge of Palouse River near Potlatch, Idaho, for the year ending Sept. 30, 1915.

Month.	Discharge in second-feet.			Run-off (total in acre-feet).	Accuracy.
	Maximum.	Minimum.	Mean.		
October	....	....	8.49	522	B.
November	148	10.5	33.2	1,980	B.
December	26	....	14.0	861	C.
January	....	....	12.9	793	D.
February	163	....	90.4	5,020	B.
March	1,030	128	351	21,600	A.
April	765	76	285	17,000	A.
May	2,580	83	447	27,500	A.
June	343	10.9	93.1	5,540	A.
July	35	6.7	18.4	1,130	B.
August	14.2	4.4	8.15	501	B.
September	8.5	3.2	5.43	323	C.
The period	2,580	3.2	114	82,800	

PALOUSE RIVER NEAR WINONA, WASH.[1]

Location.—In sec. 5, T. 16 N., R. 39 E., 200 feet below Rock Creek, 7 miles southwest of Winona, in Whitman County.

Drainage area.—Not measured.

Records available.—December 16, 1914, to September 30, 1915.

Gage.—Inclined and vertical staff on right bank, 200 feet below confluence with Rock Creek; read by Theo. McDougall.

Discharge measurements.—Made from cable 900 feet below gage or by wading.

Channel and control.—Bed composed of gravel; probably shifting. Right bank high; left bank subject to overflow at high stages. Stage of zero flow, according to measurements made December 16, 1914, and September 18, 1915, 0.0±0.1 foot.

Extremes of discharge.—Maximum stage recorded during year, 5.2 feet at 4.20 p. m. February 3 (discharge, 2,800 second-feet); minimum stage recorded, 0.48 foot at 2.30 p. m. September 27 (discharge, 9 second-feet).

Winter flow.—Stage-discharge relation seriously affected by ice; flow estimated from discharge measurements, observer's notes, and weather records.

Diversions.—Several irrigation ditches divert water above gage. Though small individually, they probably aggregate a large proportion of the extreme low-water flow.

Regulation.—None.

Accuracy.—Stage-discharge relation practically permanent during the year; affected by ice for a few days in December and January. Rating curve well defined below 3,100 second-feet. Gage read to hundredths once daily; corrections to be applied to observed gage heights somewhat uncertain; very little diurnal fluctuation. Daily discharge ascertained by applying daily gage heights to rating table. Records good except for periods in which flow was less than 100 second-feet or gage was not read for five or more days.

Discharge measurements of Palouse River near Winona, Wash., during the year ending Sept. 30, 1915.

Date.	Made by—	Gage height.	Discharge.	Date.	Made by—	Gage height.	Discharge.
		Feet.	*Sec. ft.*			*Feet.*	*Sec. ft.*
Dec. 16	C. O. Brown	0.60	[a]19.2	Feb. 5	C. O. Brown	2.66	777
Feb. 3	.....do	4.83	[b]2,380	5	.....do	2.42	629
3	.....do	5.20	[b]2,850	Mar. 3	.....do	1.92	374
4	.....do	3.78	1,600	July 16	.....do	.92	63.7
4	.....do	3.30	1,230	Sept. 18	G. L. Parker	.53	[c]12.6

[a] Measured above Rock Creek and discharge of Rock Creek, 4.7 second-feet, measured and added.
[b] Surface velocity observed and coefficient of 0.85 used to reduce to mean velocity.
[c] Measured above Rock Creek and discharge of Rock Creek, 8.3 second-feet, measured and added.

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[1] For discharge of Palouse River above Rock Creek, see p. 211.

Daily discharge, in second-feet, of Palouse River near Winona, Wash., for the year ending Sept. 30, 1915.

Day.	Dec.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.
1	....	24	233	388	1,160	202	482	76	38	13
2	....	37	1,010	388	870	234	434	70	37	12
3	....	37	2,530	388	770	234	388	66	31	12
4	....	47	1,460	434	802	234	268	62	29	11
5	....	47	737	482	836	234	268	57	27	11
6	....	44	534	588	706	234	346	52	26	11
7	....	45	534	457	588	217	268	48	29	11
8	....	48	1,010	482	534	195	195	48	29	14
9	....	48	1,230	457	482	192	172	48	29	9
10	....	44	1,380	405	434	195	172	48	27	9
11	....	48	1,230	370	346	180	189	66	26	10
12	....	48	1,010	340	346	195	166	66	26	10
13	....	55	737	370	346	217	195	59	24	11
14	....	68	534	352	346	195	195	50	24	11
15	....	68	434	380	410	180	180	58	25	12
16	18	64	346	535	366	195	166	66	24	12
17	18	60	346	730	346	195	144	62	24	13
18	16	55	507	600	306	195	138	59	21	13
19	16	60	706	457	268	250	125	59	19	14
20	18	60	706	434	268	1,930	112	50	21	14
21	17	55	706	434	234	2,620	112	50	18	14
22	16	52	646	434	234	1,770	112	47	18	13
23	15	48	534	410	234	1,080	105	39	18	13
24	15	45	507	457	192	940	100	39	17	12
25	15	39	482	482	234	836	100	37	17	14
26	25	37	434	346	234	770	100	38	16	9
27	24	42	434	366	166	706	100	39	16	9
28	19	31	410	388	174	588	100	39	14	9
29	15	55	....	388	166	588	89	39	14	9
30	17	24	....	346	195	588	82	39	13	12
31	15	37	....	1,010	....	534	....	39	13	....

NOTE.—Gage not read, discharge interpolated, July 15, 17, 30, Aug. 16, 26, and Sept. 10-17. Gage not read Mar. 10-18; discharge estimated by hydrographic comparison with record of flow of Palouse River at Hooper. Discharge Dec. 23, Jan. 16, 17, 22-25, and 28, estimated, because of ice, from observer's notes and weather records.

Monthly discharge of Palouse River near Winona, Wash., for the year ending Sept. 30, 1915.

Month.	Discharge in second-feet.			Run-off (total in acre-feet).	Accuracy.
	Maximum.	Minimum.	Mean.		
December 16-31	....	....	17.4	552	C.
January	68	24	47.5	2,920	C.
February	2,530	233	763	42,400	B.
March	1,010	....	455	28,000	C.
April	1,160	166	420	25,000	B.
May	2,620	180	546	33,600	B.
June	482	82	187	11,100	B.
July	76	37	52.1	3,200	C.
August	38	13	22.9	1,410	C.
September	14	9	11.6	690	D.
The period	....	....	....	149,000	

PALOUSE RIVER AT HOOPER, WASH.

Location.—In sec. 26, T. 15 N., R. 37 E., 1 mile east of Hooper, Whitman County, and 2 miles above Cow Creek.

Drainage area.—2,210 square miles.

Records available.—April 1, 1897, to December 31, 1899; April 1, 1900, to April 20, 1907; June 14, 1908, to July 31, 1912; March 7, 1913, to September 30, 1915

Gage.—Vertical and inclined staff in four sections, on right bank, 300 feet above and across the river from the Oregon-Washington Railroad & Navigation Co.'s water tank. Original gage (Apr. 1 to Aug. 31, 1897), a vertical staff 1 mile above site of present gage; since September 9, 1897, several gages at present site and datum. Gage read by Mrs. L. C. Huffman.

Discharge measurements.—Made by wading or from cable 200 feet below highway bridge at Hooper.

Channel and control.—Gage is in long, riffle-controlled pool. Stream bed composed of solid rock covered with loose boulders; shifts during floods. Left bank high; not subject to overflow; right bank low and covered with brush.

Extremes of discharge.—Maximum stage recorded during year, 6.7 feet at 3 p. m., May 21 (discharge, 2,580 second-feet); probably higher stage and discharge during night of February 3. (See Palouse River near Winona, Wash.) Minimum stage recorded, 0.54 foot September 10–11 (discharge, 6 second-feet).

1897–1915: Maximum stage recorded, 21.0 feet March 2, 1910 (discharge, 27,800 second-feet); minimum stage June 25, 1910 (entire flow diverted; no flow past gage part of day).

Winter flow.—Stage-discharge relation not seriously affected by ice; open-channel rating curve assumed applicable.

Diversions.—Several small irrigation ditches divert water above the gage, the largest being the Palouse Irrigation & Power Co.'s canal, the maximum capacity of which is about 15 second-feet.

Accuracy.—Stage-discharge relation changed during high water of February, 1914. Rating curve used March 7, 1913, to February 26, 1914, well defined between 150 and 10,000 second-feet; curve used February 27, 1914, to September 30, 1915, well defined between 20 and 10,000 second-feet. Gage read to hundredths once daily. Daily discharge ascertained by applying daily gage heights to rating tables. Records good except those for periods of low water.

Discharge measurements of Palouse River near Hooper, Wash., during the year ending Sept. 30, 1915.

[Made by C. O Brown.]

Date.		Gage height.	Discharge.
		Feet.	*Sec.-ft.*
Oct. 7		0.91	20.2
Feb. 6		3.50	710
May 26		3.82	776

Daily discharge, in second-feet, of Palouse River at Hooper, Wash., from Mar. 7, 1913, to Sept. 30, 1915.

Day.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.
1913.							
1	....	11,800	1,500	510	300	52	29
2	....	9,900	1,320	414	246	44	29
3	....	6,500	1,320	396	222	44	29
4	....	4,880	1,100	414	222	44	29
5	....	4,520	1,040	414	200	36	28
6	....	5,650	995	396	200	36	28
7	5.130	4,880	995	362	190	36	28
8	6,500	4,160	995	330	180	32	28
9	6,500	3,810	1,200	330	180	28	28
10	6,200	3,480	1,320	315	171	28	28
11	6,300	3,480	1,500	300	162	28	28
12	5,390	4,400	1,440	300	162	28	28
13	4,400	4,520	1,380	286	162	28	28
14	2,870	4,880	1,380	246	154	28	28
15	2,670	4,880	1,380	246	145	28	28
16	2,490	5,130	1,100	234	145	28	28
17	2,490	4,520	995	222	145	28	28
18	4,880	3,920	1,100	200	137	28	28
19	7,300	3,370	1,100	200	137	28	28
20	6,660	3,170	1,040	211	129	32	26
21	4,880	3.070	1,040	222	107	32	28
22	3,700	2,870	995	234	100	32	28
23	2,770	2,670	995	272	83	32	28
24	2,490	2,160	945	300	70	28	28
25	2,160	1,810	945	272	64	28	32
26	1,810	1,680	765	286	64	28	28
27	1,560	1,500	720	432	77	28	28
28	1,620	2,160	720	414	77	28	28
29	4,160	2,020	634	396	77	28	28
30	10,600	2,020	634	346	70	28	28
31	12,800	....	591	....	54	28	....

Day.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.
1913–14.												
1	28	70	211	107	677	2,670	677	379	156	52	8	7
2	28	74	211	107	634	2,970	677	379	156	52	8	7
3	28	70	190	114	510	2,240	677	379	156	47	7	7
4	36	70	137	200	432	2,240	765	362	121	38	6	7
5	36	74	114	1,200	330	1,880	765	379	113	38	6	7
6	36	100	137	1,260	330	1,740	995	379	113	38	6	7
7	36	87	145	855	272	1,560	1,440	379	105	33	6	7
8	36	70	129	810	272	1,380	1,740	414	105	33	6	8
9	44	74	129	720	330	1,380	1,880	396	105	31	7	8
10	44	87	107	720	379	1,380	1,740	346	105	36	6	8
11	44	100	100	677	396	1,440	1,560	315	105	33	6	8
12	44	129	100	490	432	1,380	1,260	286	98	31	6	8
13	49	100	107	300	490	1,380	1,100	286	90	33	6	8
14	49	87	100	330	591	1,320	1,040	271	90	36	6	8
15	49	87	100	330	634	1,320	1,040	271	76	38	5	8
16	49	87	100	330	591	1,260	1,100	286	76	38	7	6
17	54	87	100	330	677	1,260	1,150	286	121	29	6	6
18	59	80	87	330	634	1,260	995	286	98	29	6	21
19	70	74	100	346	634	1,260	900	300	83	25	6	21
20	74	74	87	346	634	1,260	765	271	63	25	6	20
21	70	87	80	346	945	1,200	765	258	58	19	7	21
22	64	100	87	346	1,620	1,200	765	219	47	16	8	18
23	64	145	87	1,380	3,070	1,100	677	219	45	16	8	18
24	64	145	87	1,100	2,240	1,100	591	196	42	10	7	18
25	64	145	87	1,260	2,580	855	510	196	38	10	7	19
26	64	145	94	1,040	4,760	765	510	166	38	11	7	19
27	64	154	100	1,380	4,040	765	451	175	47	10	7	19
28	64	145	100	1,100	3,370	765	432	175	47	10	7	19
29	64	145	100	1,380	....	677	396	156	58	10	7	18
30	64	222	107	765	....	677	379	156	58	9	7	18
31	64	....	107	677	....	677	....	156	....	8	7	....

Daily discharge, in second-feet, of Palouse River at Hooper, Wash., from Mar. 7, 1913, to Sept. 30, 1915—Continued.

Day.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.
1914-15.												
1	15	36	47	29	634	470	1,260	196	432	76	33	8
2	20	34	50	38	945	432	945	208	379	63	31	8
3	18	32	58	40	1,680	432	855	244	346	63	25	8
4	16	30	47	35	2,400	414	765	330	330	58	24	8
5	14	28	58	42	855	470	855	244	300	58	22	7
6	20	29	52	42	634	510	810	196	286	63	21	7
7	20	29	47	42	550	591	765	219	286	58	21	6
8	21	28	47	43	634	510	634	196	219	52	21	6
9	22	29	47	42	995	362	510	196	219	52	22	6
10	24	90	50	43	1,100	490	451	196	196	42	22	6
11	22	113	42	44	995	396	379	196	175	54	21	6
12	22	90	42	52	995	379	346	186	166	58	19	6
13	25	70	33	58	1,100	346	330	232	166	58	19	7
14	30	63	38	71	1,100	379	346	208	196	52	16	8
15	24	56	33	66	995	362	346	196	166	47	16	8
16	24	52	33	61	432	396	362	196	166	42	16	8
17	24	58	31	61	396	510	346	208	156	44	14	19
18	24	98	33	61	810	765	315	208	138	52	14	19
19	25	90	28	50	765	720	300	219	130	50	16	20
20	33	76	29	58	855	677	286	1,560	130	42	13	19
21	35	76	26	52	810	677	286	2,580	113	38	12	19
22	27	63	29	52	765	634	232	2,320	105	33	12	19
23	38	56	22	52	634	634	232	1,150	98	33	12	19
24	47	63	25	54	634	591	208	1,040	98	29	10	19
25	83	63	24	35	510	550	175	855	113	29	9	19
26	76	70	25	38	432	591	196	677	90	27	8	19
27	58	72	22	33	510	510	196	720	90	27	8	16
28	58	72	29	38	550	432	196	634	90	25	8	16
29	44	70	35	33	......	396	166	591	83	29	8	14
30	39	58	29	38	......	432	166	510	76	31	8	12
31	38	......	34	42	......	591	......	510	......	29	8	......

Monthly discharge of Palouse River at Hooper, Wash., for the period Mar. 7, 1913, to Sept. 30, 1915.

Month.	Discharge in second-feet.			Run-off (total in acre-feet).	Accuracy.
	Maximum.	Minimum.	Mean.		
1913.					
March 7-31	12,800	1,560	4,730	235,000	A.
April	11,800	1,500	4,130	246,000	A.
May	1,500	591	1,070	65,800	A.
June	510	200	317	18,900	A.
July	300	54	143	8,790	B.
August	52	28	31.7	1,950	D.
September	32	26	28.2	1,680	D.
The period	......	......	......	578,000	
1913-14.					
October	74	28	51.7	3,180	C.
November	222	70	104	6,190	C.
December	211	80	114	7,010	B.
January	1,380	107	667	41,000	A.
February	4,760	272	1,160	64,400	A.
March	2,970	677	1,370	84,200	A.
April	1,880	379	925	55,000	A.
May	414	156	281	17,300	A.
June	156	38	87.1	5,180	A.
July	52	8	27.2	1,670	A.
August	8	6	6.61	406	C.
September	21	6	12.5	744	B.
The year	4,760	6	395	286,000	

Monthly discharge of Palouse River at Hooper, Wash., for the period Mar. 7, 1913, to Sept. 30, 1915—Continued.

Month.	Discharge in second-feet.			Run-off (total in acre-feet).	Accuracy.
	Maximum.	Minimum.	Mean.		
1914-15.					
October	83	14	31.8	1,960	A.
November	113	28	59.8	3,560	A.
December	58	22	36.9	2,270	A.
January	71	29	46.6	2,870	A.
February	2,400	432	847	47,000	A.
March	765	346	505	31,100	A.
April	1,260	166	442	26,300	A.
May	2,580	186	556	34,200	A.
June	432	76	185	11,000	A.
July	76	25	45.6	2,800	A.
August	33	8	16.4	1,010	B.
September	20	6	12.1	720	B.
The year	2,580	6	227	165,000	

ROCK CREEK NEAR EWAN, WASH.[1]

Location.—In sec. 13, T. 19 N., R. 40 E., at outlet of Rock Lake, 1½ miles north of Ewan, in Whitman County.

Drainage area.—Not measured.

Records available.—October 15, 1903, to September 30, 1905 (published as "Rock Creek near St. John, Wash."); March 30, 1914, to September 30, 1915.

Gage.—Vertical staff on county bridge 200 feet below outlet of Rock Lake; fastened to downstream caisson of second pier from left bank. Gage used from October 15, 1903, to September 30, 1905, was a vertical rod fastened to fifth pile bent of southeast approch to highway bridge over the creek at outlet of lake; datum of this gage not the same as that of present gage. Gage read by Herbert Babcock.

Discharge measurements.—Made by wading or from county bridge at gage.

Channel and control.—Bed of stream composed of solid rock covered with sharp volcanic débris; will not shift. Right bank high; left bank low and subject to overflow at gage height 5.0 feet, so that two channels are formed. Control for stages up to 2.00 feet is rock riffle 100 feet below gage; control for higher stages is an unfinished earth dam half a mile below; low-water control permanent; high-water control unstable. Stage of zero flow, according to measurements made October 29, 1914, 0.35±0.05 foot.

Extremes of discharge.—Maximum stage recorded during year, 4.3 feet at 4 p. m. February 12 (discharge, 393 second-feet); minimum stage recorded, 0.30 foot October 1-17 (discharge practically zero).

1903–1905, 1914–15: Maximum stage recorded, 15.60 feet March 9, 1904 (discharge, 1,980 second-feet); minimum stage recorded, 10.00 feet September 23 to October 25, 1904, 9.76 feet September 24–30, 1905, 0.30 foot September 4–9, 1914, 0.20 foot September 10–30, 1914, and 0.30 foot October 1–17, 1914 (discharge during these periods practically zero).

Winter flow.—Stage-discharge relation not affected by ice. Ice formed in still water, but control remained open.

Diversions.—None.

Regulation.—The gates in the low dam at outlet of Rock Lake are seldom regulated.

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[1] For discharge of Rock Creek at mouth see p. 211.

ACCURACY.—Stage-discharge relation practically permanent; not affected by ice. Rating curve poorly defined below 10 second-feet, fairly well defined between 10 and 60 second-feet, and well defined between 60 and 300 second-feet. Gage read to hundredths once daily; gage-height record not very reliable April 29 to October 31, 1914, and August 22 to September 30, 1915. Daily discharge ascertained by applying daily gage heights to rating table. Records good for discharge above 30 second-feet, fair for discharge between 10 and 30 second-feet, and poor below 10 second-feet.

Discharge measurements of Rock Creek near Ewan, Wash., during 1914-15.

Date.	Made by—	Gage height.	Discharge.	Date.	Made by—	Gage height.	Discharge.
1914.		*Feet.*	*Sec.-ft.*	1915.		*Feet.*	*Sec.-ft.*
June 17	G. L. Parker	1.04	15.8	Feb. 25	C. O. Brown	3.04	186
				28	.....do	2.77	163
1915.				Mar. 18	.....do	1.88	75.7
Jan. 30	C. O. Brown	.76	5.0	10	.....do	1.88	73.7
30	.....do	.76	4.9	July 31	.....do	1.21	21.9
30	.....do	.76	3.9	31	.....do	1.21	25.0
30	.....do	.76	4.1	31	.....do	1.21	22.6
Feb. 25	.....do	3.05	183	31	.....do	1.21	23.7

Daily discharge, in second-feet, of Rock Creek near Ewan, Wash., for the years ending Sept. 30, 1914-15.

Day.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.
1914.							
1	....	119	76	29	9	6.0	0.1
2	....	119	67	29	9	3.2	.1
3	....	114	76	29	9	3.2	.1
4	....	119	76	29	9	3.2	.0
5	....	124	67	29	9	3.2	.0
6	....	124	67	29	9	3.2	.0
7	....	124	67	23	9	3.2	.0
8	....	134	58	23	9	3.2	.0
9	....	134	58	23	9	3.2	.0
10	....	134	58	23	9	3.2	.0
11	....	134	58	23	9	3.2	.0
12	....	134	50	18	9	3.2	.0
13	....	134	50	18	9	3.2	.0
14	....	124	42	18	9	3.2	.0
15	....	124	42	18	9	3.2	.0
16	....	119	42	13	9	3.2	.0
17	....	119	42	13	9	1.5	.0
18	....	119	42	13	9	1.5	.0
19	....	114	42	13	6	1.5	.0
20	....	114	42	13	6	1.5	.0
21	....	109	35	13	6	1.5	.0
22	....	104	35	9	6	1.5	.0
23	....	109	35	9	6	.6	.0
24	....	90	35	9	6	.6	.0
25	....	90	29	9	6	.6	.0
26	....	90	29	9	6	.6	.0
27	....	85	29	9	6	.6	.0
28	....	85	29	9	6	.6	.0
29	....	76	23	9	6	.6	.0
30	119	76	23	9	6	.1	.0
31	119	....	23	....	6	.1	....

Daily discharge, in second-feet, of Rock Creek near Ewan, Wash., for the years ending Sept. 30, 1914-15—Continued.

Day.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.
1914-15.												
1	0.0	0.1	1.1	1.8	5	174	39	37	50	36	23	6.0
2	.0	.1	1.1	2.0	9	164	37	37	50	35	23	6.0
3	.0	.1	1.1	2.2	29	154	38	37	50	35	22	6.0
4	.0	.1	1.1	2.5	50	134	39	36	50	36	21	6.0
5	.0	.2	1.1	2.7	50	134	39	36	50	35	21	6.0
6	.0	.2	1.2	2.9	58	134	38	36	50	35	21	6.0
7	.0	.2	1.3	3.0	67	124	38	36	50	35	21	6.0
8	.0	.3	1.4	3.0	67	124	38	35	50	34	20	6.0
9	.0	.3	1.4	3.0	76	124	37	36	48	34	20	6.0
10	.0	.3	1.4	3.2	131	114	37	36	48	34	19	6.0
11	.0	.2	1.5	3.2	260	109	37	35	46	34	19	6.0
12	.0	.2	1.5	3.0	393	104	37	35	46	34	18	6.0
13	.0	.6	1.5	3.0	260	85	37	35	45	33	18	6.0
14	.0	.6	1.5	3.0	245	94	37	36	45	33	17	3.2
15	.0	.6	1.5	3.0	293	90	36	35	44	33	16	3.2
16	.0	.8	1.5	2.9	330	85	36	35	42	32	16	3.2
17	.0	.8	1.5	2.9	293	85	35	35	42	30	16	3.2
18	.1	.9	1.0	3.0	245	76	35	42	41	29	15	3.2
19	.1	.9	1.0	3.0	245	76	36	46	40	29	14	3.2
20	.1	.9	1.0	3.2	260	76	35	48	39	29	13	3.2
21	.1	.9	1.1	3.2	276	85	35	49	39	28	13	3.2
22	.1	.9	1.1	3.2	245	76	35	50	39	27	13	3.2
23	.1	1.0	1.1	3.7	218	76	35	48	38	26	9	3.2
24	.1	1.0	1.2	4.0	206	76	36	50	38	26	9	3.2
25	.1	1.0	1.2	4.0	184	67	36	51	37	25	9	3.2
26	.1	1.0	1.2	4.3	174	58	36	51	36	25	9	3.2
27	.1	1.0	1.3	4.3	164	50	35	50	37	25	9	3.2
28	.1	1.0	1.5	4.6	174	42	35	49	36	25	9	3.2
29	.1	1.1	1.5	4.8	....	42	36	49	36	24	9	1.5
30	.1	1.1	1.5	4.8	....	41	36	50	35	24	9	1.5
31	.1	....	1.8	5.0	....	39	....	50	....	23	9	....

Monthly discharge of Rock Creek near Ewan, Wash., for the years ending Sept. 30, 1914 and 1915.

Month.	Discharge in second-feet.			Run-off (total in acre-feet).	Accuracy.
	Maximum.	Minimum.	Mean.		
1914.					
March 30-31	119	119	119	472	B.
April	134	76	113	6,720	B.
May	76	23	46.7	2,870	B.
June	29	9	17.3	1,030	C.
July	9	6	7.74	476	D.
August	6	0.1	2.17	133	D.
September	0.1	.0	.01	0.6	D.
The period	....	....	....	11,700	
1914-15.					
October	0.1	0.0	0.05	3.07	D.
November	1.1	.1	.61	36.3	D.
December	1.8	1.0	1.30	79.9	D.
January	5	1.8	3.30	203	D.
February	393	5	179	9,940	B.
March	174	39	93.9	5,770	B.
April	39	35	36.5	2,170	B.
May	51	35	41.6	2,560	B.
June	50	35	43.2	2,570	B.
July	36	23	30.4	1,870	B.
August	23	9	15.5	953	C.
September	6	1.5	4.30	256	D.
The year	393	.0	36.5	26,400	

MISCELLANEOUS MEASUREMENTS.

Miscellaneous measurements in Snake River drainage basin during the year ending Sept. 30, 1915.

Date.	Stream.	Tributary to or diverting from—	Locality.	Gage height.	Discharge.
				Feet.	*Sec.-ft.*
Jan. 23	Spring Creek	Blackfoot Reservoir	One-fourth mile above mouth, near Henry, Idaho.		2.6
22	Warm Springs	Little Blackfoot	300 feet above mouth near Henry, Idaho.		.8
22	Winschell ditch	do	100 feet below heading near Henry, Idaho.		.2
22	Wilson Creek	Blackfoot Reservoir	East of Government dam about 10 miles northwest of Henry, Idaho.		1.7
20	Hot Spring Creek	do	About three-fourths mile north of Government dam, Idaho.		4.7
Apr. 29	Upper Fort Hall canal.	Blackfoot River	South boundary of Fort Hall Indian Reservation near Tyhee, Idaho.		108
May 27	do	do	do		88.9
June 11	do	do	do		75.6
July 22	do	do	do		106
Sept. 25	do	do	do		45.1
Aug. 7	Portneuf River	Snake River	Below springs near American Falls, Idaho.		1,420
Nov. 11	Cassia Creek	Raft River	Conant, Idaho	1.95	12.3
May 2	Jakes Creek	Salmon Falls Creek	Below Hubbard ranch, in sec. 33, T. 44 N., R. 63 E. near Contact, Nev.	1.29	2.4
July 25	do	do	do	1.17	.5
26	do	do	do	1.17	.6
24	Shoshone Creek	do	Near mouth, in sec. 17, T. 47 N., R. 65 E., near San Jacinto, Nev.		11.2
8[a]	Big Wood River	Snake River	Below junction with Camas Creek near Stanton, Idaho.	3.56	453
10[a]	do	do	do	3.53	448
13[a]	do	do	do	3.30	357
16[a]	do	do	do	3.09	286
17[a]	do	do	do	2.96	230
19[a]	do	do	do	2.82	185
21[a]	do	do	do	2.72	148
[a]	do	do	do	2.90	210
[a]	do	do	do	2.79	179
26[a]	do	do	do	2.70	155
30[a]	do	do	do	2.59	121
Aug. 2[a]	do	do	do	2.64	139
7[a]	do	do	do	2.57	123
10[a]	do	do	do	2.52	118
20[a]	do	do	do	2.55	116
20[a]	do	do	do	2.55	122
20[a]	do	do	do	2.55	128
25[a]	do	do	do	2.54	114
28[a]	do	do	do	2.47	104
Sept. 2[a]	do	do	do	2.47	108
13[a]	do	do	do	2.48	108
June 10[a]	Silver Creek	Little Wood River	Below Kilpatrick dam near Picabo, Idaho.	[b] 1.97	141
16[a]	do	do	do	[b] 2.11	109
10[a]	do	do	Tikura, Idaho	[b] 2.00	98.4
16[a]	do	do	do	[b] 2.25	75.0
Mar. 1	Boise River	Snake River	Arrowrock dam, Idaho		347
1[c]	do	do	do		329
July 16	Rattlesnake Creek	South Fork of Boise River.	Near mouth, near Lenox, Idaho.	.95	13.7
Aug. 27	Malheur River	Snake River	Above mouth of South Fork near Riverside, Oreg.		7.8
Mar. 28	do	do	Former gaging station at Maddock's ranch near Little Valley, Oreg.	1.85	621
Jan. 28	Seepage	East portal of Tunnel No. 1.	Near Namorf, Oreg		.8
Apr. 24	do	do	do		.8

[a] Measurement furnished by Idaho Irrigation Co.

[b] Inverted gage.

[c] Furnished by United States Reclamation Service.

Miscellaneous measurements in Snake River drainage basin during the year ending Sept. 30, 1915—Continued.

Date.	Stream.	Tributary to or diverting from—	Locality.	Gage height.	Discharge.
				Feet.	*Sec.-ft.*
Mar. 28	Vines ditch	Malheur River	Former gaging station near Little Valley, Oreg.	1.81	9.0
Apr. 1	Willow Creek	do	Ironside, Oreg		8.6
May 7	do	do	do		3.6
Apr. 1	do	do	NW. ¼, sec. 10, T. 14 S., R. 40 E., near Malheur, Oreg.		10.6
May 7	do	do	do		4.7
June 15	Idaho Power Co.'s canal.	Payette River	Horseshoe Bend, Idaho		355
May 21	Petaha Creek	Tucannon River	Pomeroy, Wash		18.5
Feb 4	Palouse River	Snake River	Above Rock Creek, near Winona, Wash.		964
4	do	do	do		1,010
5	do	do	do		548
5	do	do	do		477
Sept 18	do	do	do		4.3
Feb 4	Rock Creek	Palouse River	Mouth, near Winona, Wash.		[a] 311
4					
5	do	do	do		[a] 390
5	do	do	do		[a] 164
Mar. 3	do	do	do		[a] 151
July 16	do	do	do		195
Sept. 18	do	do	do		33.1
Apr. 17	do	do	do		8.3
	Washington Development Co.'s canal.	do	Opposite station on Palouse River at Hooper, Wash.	2.08	12.0

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[a] Discharge obtained by subtracting measured discharge of Palouse River above Rock Creek from computed discharge for gaging station below Rock Creek.

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STREAM-GAGING STATIONS

AND

PUBLICATIONS RELATING TO WATER RESOURCES

PART XII.—NORTH PACIFIC SLOPE BASINS

STREAM-GAGING STATIONS AND PUBLICATIONS RELATING TO WATER RESOURCES.

INTRODUCTION.

Investigation of water resources by the United States Geological Survey has consisted in large part of measurements of the volume of flow of streams and studies of the conditions affecting that flow, but it has comprised also investigation of such closely allied subjects as irrigation, water storage, water powers, underground waters, and quality of waters. Most of the results of these investigations have been published in the series of water-supply papers, but some have appeared in the bulletins, monographs, professional papers, and annual reports.

The results of stream-flow measurements are now published annually in 12 parts, each part covering an area whose boundaries coincide with natural drainage features as indicated below:

Part I. North Atlantic slope basins.
II. South Atlantic slope and eastern Gulf of Mexico basins.
III. Ohio River basin.
IV. St. Lawrence River basin.
V. Upper Mississippi River and Hudson Bay basins.
VI. Missouri River basin.
VII. Lower Mississippi River basin.
VIII. Western Gulf of Mexico basins.
IX. Colorado River basin.
X. Great Basin.
XI. Pacific slope basins in California.
XII. North Pacific slope basins, in three volumes:
    A, Pacific slope basins in Washington and upper Columbia River basin.
    B, Snake River basin.
    C, Lower Columbia River basin and Pacific slope basins in Oregon.

HOW GOVERNMENT REPORTS MAY BE OBTAINED OR CONSULTED.

Water-supply papers and other publications of the United States Geological Survey containing data in regard to the water resources of the United States may be obtained or consulted as indicated below.

1. Copies may be obtained free of charge by applying to the Director of the Geological Survey, Washington, D. C. The edition printed for free distribution is, however, small and is soon exhausted.

2. Copies may be purchased at nominal cost from the Superintendent of Documents, Government Printing Office, Washington, D. C., who will on application furnish lists giving prices.

3. Sets of the reports may be consulted in the libraries of the principal cities in the United States.

4. Complete sets are available for consultation in the local offices of the water-resources branch of the Geological Survey, as follows:

Boston, Mass., 2500 Customhouse.
Albany, N. Y., Room 18, Federal Building.
Atlanta, Ga., Post Office Building.
Madison, Wis., care of Railroad Commission of Wisconsin.
Topeka, Kans., 25 Federal Building.
Helena, Mont., Montana National Bank Building.
Denver, Colo., 403 New Post Office Building.
Salt Lake City, Utah, 421 Federal Building.
Boise, Idaho, 615 Idaho Building.
Portland, Oreg., 416 Couch Building.
Tacoma, Wash., 406 Federal Building.
San Francisco, Cal., 328 Customhouse.
Los Angeles, Cal., 619 Federal Building.
Phoenix, Ariz., 417 Fleming Building.
Austin, Tex., Old Post Office Building.
Honolulu, Hawaii, 14 Capitol Building.

A list of the Geological Survey's publications may be obtained by applying to the Director of the United States Geological Survey, Washington, D. C.

STREAM-FLOW REPORTS.

Stream-flow records have been obtained at more than 3,800 points in the United States, and the data obtained have been published in the reports tabulated below:

Stream-flow data in reports of the United States Geological Survey.

A—Annual Report; B—Bulletin; W—Water-Supply Paper.]

Report.	Character of data.	Year.
10th A, pt. 2	Descriptive information only	
11th A, pt. 2	Monthly discharge and descriptive information	1884 to September, 1890.
12th A, pt. 2	do	1884 to June 30, 1891.
13th A, pt. 3	Mean discharge in second-feet	1884 to Dec. 31, 1892.
14th A, pt. 2	Monthly discharge (long-time records, 1871 to 1893)	1888 to Dec. 31, 1893.
B 131	Descriptions, measurements, gage heights, and ratings	1893 and 1894.
16th A, pt. 2	Descriptive information only	
B 140	Descriptions, measurements, gage heights, ratings, and monthly discharge (also many data covering earlier years).	1895.
W 11	Gage heights (also gage heights for earlier years)	1896.
18th A, pt. 4	Descriptions, measurements, ratings, and monthly discharge (also similar data for some earlier years).	1895 and 1896.
W 15	Descriptions, measurements, and gage heights, eastern United States, eastern Mississippi River, and Missouri River above junction with Kansas.	1897.
W 16	Descriptions, measurements, and gage heights, western Mississippi River below junction of Missouri and Platte, and western United States.	1897.
19th A, pt. 2	Descriptions, measurements, ratings, and monthly discharge (also some long-time records).	1897.
W 27	Measurements, ratings, and gage heights, eastern United States, eastern Mississippi River, and Missouri River.	1898.
W 28	Measurements, ratings, and gage heights, Arkansas River and western United States.	1898.

Stream flow data in reports of the United States Geological Survey—Continued.

Report.	Character of data.	Year.
20th A, pt. 4	Monthly discharge (also for many earlier years)	1898.
W 35 to 39	Descriptions, measurements, gage heights, and ratings	1899.
21st A, pt. 4	Monthly discharge	1899.
W 47 to 52	Descriptions, measurements, gage heights, and ratings	1900.
22d A, pt. 4	Monthly discharge	1900.
W 65, 66	Descriptions, measurements, gage heights, and ratings	1901.
W 75	Monthly discharge	1901.
W 82 to 85	Complete data	1902.
W 97 to 100	.....do	1903.
W 124 to 135	.....do	1904.
W 165 to 178	.....do	1905.
W 201 to 214	.....do	1906.
W 241 to 252	.....do	1907-8.
W 261 to 272	.....do	1909.
W 281 to 292	.....do	1910.
W 301 to 312	.....do	1911.
W 321 to 332	.....do	1912.
W 351 to 362	.....do	1913.
W 381 to 394	.....do	1914.
W 401 to 414	.....do	1915.

The records at most of the stations discussed in these reports extend over a series of years, and miscellaneous measurements at many points other than regular gaging stations have been made each year. An index of the reports containing records obtained prior to 1904 has been published in Water-Supply Paper 119.

The table following gives, by years and drainage basins, the numbers of the papers on surface-water supply published from 1899 to 1915. The data for any particular station will, as a rule, be found in the reports covering the years during which the station was maintained. For example, data for Machias River at Whitneyville, Me., 1903 to 1915, are published in Water-Supply Papers 97, 124, 165, 201, 241, 261, 281, 301, 321, 351, 381, and 401, which contain records for the New England streams from 1903 to 1915. Results of miscellaneous measurements are published by drainage basins.

In these papers and in the following lists the stations are arranged in downstream order. The main stem of any river is determined by measuring or estimating its drainage area—that is, the headwater stream having the largest drainage area is considered the continuation of the main stream, and local changes in name and lake surface are disregarded. All stations from the source to the mouth of the main stem of the river are presented first, and the tributaries in regular order from source to mouth follow, the streams in each tributary basin being listed before those of the next basin below.

In exception to this rule the records for Mississippi River are given in four parts, as indicated on page III, and the records for large lakes are presented in order of the streams around the rim of the lake.

Numbers of water-supply papers containing results of stream measurements, 1899–1915.

Year.	I	II	III	IV	V	VI	VII	VIII	IX	X	XI	XII		
	North Atlantic slope basins (St. John River to York River).	South Atlantic slope and eastern Gulf of Mexico basins (James River to the Mississippi).	Ohio River basin.	St. Lawrence River basin.	Hudson Bay and upper Mississippi River basins.	Missouri River basin.	Lower Mississippi River basin.	Western Gulf of Mexico basins.	Colorado River basin.	Great Basin.	Pacific slope basins in California.	North Pacific slope basins.		
												Pacific slope basins in Washington and upper Columbia River.	Snake River basin.	Lower Columbia River and Pacific slope basins in Oregon.
1899 [a]	35	[b] 35,36	36	36	36	[c] 36,37	37	37	[d] 37,38	38, [e] 39	38, [f] 39	38	38	38
1900 [g]	47, [h] 48	48	48, [i] 49	49	49	49, [j] 50	50	50	50	51	51	51	51	51
1901	65,75	65,75	65,75	65,75	[k] 65,66,75	66,75	[k] 65,66,75	66,75	66,75	66,75	66,75	66,75	66,75	66,75
1902	82	[b] 82,83	83	[l] 82,83	[k] 83,85	84	[k] 83,84	84	85	85	85	85	85	85
1903	97	[b] 97,98	98	97	[h] 98,99, [m] 100	99	[k] 98,99	99	100	100	100	100	100	100
1904	[n] 124, [o] 125, [p] 126	[p] 126,127	128	129	[k] 128,130	130, [q] 131	[k] 128,131	132	133	133, [r] 134	134	135	135	135
1905	[n] 165, [o] 166, [p] 167	[p] 167,168	169	170	171	172	[k] 169,173	174	175, [s] 177	176, [r] 177	177	178	178	[t] 177,178
1906	[n] 201, [o] 202, [p] 203	[p] 203,204	205	206	207	208	[k] 205,209	210	211	212, [r] 213	213	214	214	214
1907–8	241	242	243	244	245	246	247	248	249	250, [r] 251	251	252	252	252
1909	261	262	263	264	265	266	267	268	269	270, [r] 271	271	272	272	272
1910	281	282	283	284	285	286	287	288	289	290	291	292	292	292
1911	301	302	303	304	305	306	307	308	309	310	311	312	312	312
1912	321	322	323	324	325	326	327	328	329	330	331	332–A	332–B	332–C
1913	351	352	353	354	355	356	357	358	359	360	361	362–A	362–B	362–C
1914	381	382	383	384	385	386	387	388	389	390	391	392	393	394
1915	401	402	403	404	405	406	407	408	409	410	411	412	413	414

[a] Rating tables and index to Water-Supply Papers 35–39 contained in Water-Supply Paper 39. Tables of monthly discharge for 1899 in Twenty-first Annual Report, Part IV.

[b] James River only.

[c] Gallatin River.

[d] Green and Gunnison rivers and Grand River above junction with Gunnison.

[e] Mohave River only.

[f] Kings and Kern rivers and south Pacific slope drainage basins.

[g] Rating tables and index to Water-Supply Papers 47–52 and data on precipitation, wells, and irrigation in California and Utah contained in Water-Supply Paper 52. Tables of monthly discharge for 1900 in Twenty-second Annual Report, Part IV.

[h] Wissahickon and Schuylkill rivers to James River.

[i] Scioto River.

[j] Loup and Platte rivers near Columbus, Nebr., and all tributaries below junction with Platte.

[k] Tributaries of Mississippi from east.

[l] Lake Ontario and tributaries to St. Lawrence River proper.

[m] Hudson Bay only.

[n] New England rivers only.

[o] Hudson River to Delaware River, inclusive.

[p] Susquehanna River to Yadkin River, inclusive.

[q] Platte and Kansas rivers.

[r] Great Basin in California, except Truckee and Carson river basins.

[s] Below junction with Gila.

[t] Rogue, Umpqua, and Siletz rivers only.

NORTH PACIFIC SLOPE DRAINAGE BASINS.

PRINCIPAL STREAMS.

The largest rivers discharging into the Pacific Ocean in Oregon and Washington are Rogue, Umpqua, and Columbia rivers and streams that reach the ocean through Puget Sound. The principal tributaries of the Columbia are Kootenai, Clark Fork, Spokane, Wenatchee, Yakima, Snake, Walla Walla, Umatilla, John Day, Deschutes, Klickitat, Willamette, and Lewis rivers. Nisqually, Puyallup, White, Snohomish, and Skagit rivers flow into Puget Sound. The streams of this division drain wholly or in part the States of Idaho, Montana, Nevada, Oregon, Utah, Washington, and Wyoming.

In addition to the list of gaging stations and the annotated list of publications relating specifically to the section, these pages contain a similar list of reports that are of general interest in many sections and cover a wide range of hydrologic subjects, and also brief references to reports published by State and other organizations (see pp. XXXI–XXXII).

GAGING STATIONS.

NOTE.—Dash after a date indicates that station was being maintained September 30, 1915. Period after a date indicates discontinuance.

BETWEEN COLUMBIA RIVER AND PUGET SOUND.

Chehalis River at Centralia, Wash., 1910–11.
Quinault River at Quinault Lake, Wash., 1911–
Soleduck River near Quillayute, Wash., 1897–1901.
    Kalawa River near Forks, Wash., 1897–1901.

PUGET SOUND DRAINAGE BASINS.

Elwha River at McDonald, Wash., 1897–1901.
Elwha River near Port Angeles, Wash., 1911–12.
Dungeness River at Sequin, Wash., 1897–98.
Dungeness River at Dungeness, Wash., 1898–1901.
Dosewallips River at Brinnon, Wash., 1910–11.
Duckabush River near Duckabush, Wash., 1910–11.
Skokomish River, North Fork (head of Skokomish River), near Hoodsport, Wash., 1910–11.
Nisqually River near Ashford, Wash., 1910–1914.
Nisqually River near La Grande, Wash., 1906–1911.
Puyallup River near Electron, Wash., 1909–
Puyallup River at Alderton, Wash., 1914–
Puyallup River at Puyallup, Wash., 1914–
    Carbon River at Fairfax, Wash., 1910–1912.
    White River below Forks, near Enumclaw, Wash., 1911–12.

- Puyallup River tributaries—Continued.
  - White River at Buckley, Wash., 1899–1903; 1910–11; 1913–
    - Greenwater River at mouth, near Enumclaw, Wash., 1911–12.
    - White River flume at Buckley, Wash., 1913–
    - Green River at Kanasket, Wash., 1911.
- Duwamish River:
  - Cedar River at Vaughn Bridge, near Cedar Lake, Wash., 1898–99.
  - Cedar River at Cedar Lake, near North Bend, Wash., 1902–3.
  - Cedar River near Cedar Falls, Wash., 1914–
  - Cedar River near Landsburg, Wash., 1914–
  - Cedar River near Ravensdale, Wash., 1901–1912.
  - Cedar River at Clifford Bridge, near Ravensdale, Wash., 1895–1898.
- Skykomish River, South Fork (head of Snohomish River), near Berlin, Wash., 1910–11.
- Skykomish River, South Fork, near Index, Wash., 1902–1905; 1911–12; 1913–
- Skykomish River at Sultan, Wash., 1910–11.
  - Foss River near Skykomish, Wash., 1911.
    - East Fork of Foss River near Skykomish, Wash., 1911.
  - Miller Creek near Berlin, Wash., 1911–
    - West Fork of Miller Creek near Berlin, Wash., 1911.
  - North Fork of Skykomish River at Index, Wash., 1910–
  - Snoqualmie River, Middle Fork (head of Snoqualmie River), near North Bend, Wash., 1907–8; 1908– (Records for this station and other stations in Snoqualmie River basin published in Water-Supply Paper 412.)
  - Snoqualmie River near Snoqualmie, Wash., 1898–99; 1900; 1902–1904. (Revised records published in Water-Supply Paper 412.)
    - North Fork of Snoqualmie River at cable bridge, near North Bend, Wash., 1913–1915.
    - North Fork of Snoqualmie River near North Bend, Wash., 1907–
    - South Fork of Snoqualmie River near Garcia, Wash., 1910–1915.
    - South Fork of Snoqualmie River at North Bend, Wash., 1907–
    - Tokul Creek near Snoqualmie, Wash., 1907–1914.
  - Pilchuck Creek near Granite Falls, Wash., 1911.
- Stilaguamish River, South Fork (head of Stilaguamish River), near Silverton, Wash., 1910–
- Stilaguamish River, South Fork, near Robe, Wash., 1902–3.
- Stilaguamish River, South Fork, at Granite Falls, Wash., 1911; 1913–
  - Canyon Creek near Granite Falls, Wash., 1911–1913.
- Skagit River at Reflector Bar, near Marblemount, Wash., 1913–
- Skagit River near Marblemount, Wash., 1908–1914.
- Skagit River near Sedro Woolley, Wash., 1908–
  - Stetattle Creek near Marblemount, Wash., 1913–
  - Cascade River near Marblemount, Wash., 1909–1913.
  - Sauk River above Whitechuck River, near Darrington, Wash., 1910.
  - Sauk River above Clear Creek, near Darrington, Wash., 1910–1913.
  - Sauk River at Darrington, Wash., 1914–
  - Sauk River at Suiattle Crossing, near Sauk, Wash., 1910–1912.
    - Whitechuck River near Darrington, Wash., 1910.
    - Clear Creek near Darrington, Wash., 1910–11.
  - Baker Lake (on Baker River) near Concrete, Wash., 1910–1915.
  - Baker River below Anderson Creek, near Concrete, Wash., 1910–
  - Baker River at Concrete, Wash., 1910–1915.
- Whatcom Lake near Bellingham, Wash., 1913–14.
- Whatcom Creek near Bellingham, Wash., 1910–1914.

- Nooksack River,[1] North Fork (head of Nooksack River), near Glacier, Wash., 1910–11.
- Nooksack River near Deming, Wash., 1910–11.
  - Middle Fork of Nooksack River at ranger station near Deming, Wash., 1910–11.
  - Middle Fork of Nooksack River near Deming, Wash., 1910–11.

COLUMBIA RIVER BASIN.

- Columbia River at Wenatchee, Wash., 1910.
- Columbia River near Julia, Wash., 1905.
- Columbia River at Hanford, Wash., 1910.
- Columbia River at Pasco, Wash., 1904–1910.
- Columbia River at Cascade Locks and The Dalles, Oreg., 1878–
  - Kootenai River at Libby, Mont., 1910–
  - Kootenai River at Crossport, Idaho, 1904.
  - Kootenai River near Bonners Ferry, Idaho, 1904.
  - Kootenai River near Porthill, Idaho, 1904.
    - Callahan Creek at Troy, Mont., 1911–
    - Yaak River near Troy, Mont., 1910–
    - Moyie River at Snyder, Idaho, 1911–
  - Clark Fork at Missoula, Mont., 1898–1907.
  - Clark Fork at St. Regis, Mont., 1910–
  - Clark Fork near Plains, Mont., 1910–
  - Pend Oreille Lake at Sandpoint, Idaho, 1914–
  - Clark Fork at Priest River, Idaho, 1903–1905.
  - Clark Fork at Newport, Wash., 1904–1910.
  - Clark Fork at Metaline Falls, Wash., 1908–1910; 1912–
    - Racetrack Creek near Anaconda, Mont., 1911–12; 1914–
    - Little Blackfoot River and ditch near Elliston, Mont., 1910–
    - Rock Creek near Quigley, Mont., 1910–1912.
    - Big Blackfoot River at Bonner, Mont., 1898–1905.
    - Rattlesnake Creek at Missoula, Mont., 1898–1900.
    - Bitterroot River, West Fork (head of Bitterroot River), near Darby, Mont., 1910–
    - Bitterroot River near Grantsdale, Mont., 1902–1907.
    - Bitterroot River near Missoula, Mont., 1898–1901; 1903–4.
      - East Fork of Bitterroot River near Darby, Mont., 1910–
      - Lolo Creek near Lolo, Mont., 1910–
    - St. Regis River near St. Regis, Mont., 1910–
    - Flathead River near Columbia Falls, Mont., 1910–
    - Flathead River at Demersville, near Kalispell, Mont., 1910–1912.
    - Flathead River at Damon's ranch, near Kalispell, Mont., 1910–1912.
    - Flathead River at Keller's ranch, near Holt, Mont., 1910–1912.
    - Flathead Lake (on Flathead River) near Holt, Mont., 1900.
    - Flathead Lake at Polson, Mont., 1908–
    - Flathead River near Polson, Mont., 1907–
      - Middle Fork Flathead River at Belton, Mont., 1910–
        - Lake McDonald outlet at Lake McDonald, Mont., 1912–1914.
      - South Fork of Flathead River near Columbia Falls, Mont., 1910–
      - Swan River near Big Fork, Mont., 1910–11.
      - Stillwater River near Kalispell, Mont., 1906–7.
        - Whitefish River near Kalispell, Mont., 1906.
      - Little Bitterroot River near Marion, Mont., 1910–
      - Little Bitterroot River near Hubbart, Mont., 1909–

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[1] Revised decision of United States Geographic Board rendered Oct. 3, 1917.

- Columbia River tributaries—Continned.
  - Clark Fork tributaries—Continued.
    - Flathead River tributaries—Continued.
      - Little Bitterroot River near Dayton, Mont., 1908–9.
      - Crow Creek near Ronan, Mont., 1906–
      - Crow Creek at Lozeau's ranch, near Ronan, Mont., 1911–
        - Mud Creek near Ronan, Mont., 1908–1910.
      - Mission Creek near St. Ignatius, Mont., 1906–
        - Dry Creek near St. Ignatius, Mont., 1908–
        - Post Creek at Fitzpatrick's ranch, near Ronan, Mont., 1906–1911.
        - Post Creek at Deschamp's ranch, near Ronan, Mont., 1911.
        - Post Creek near St. Ignatius, Mont., 1911–
      - Jocko River, South Fork (head of Jocko River), near Jocko, Mont., 1912–
      - Jocko River near Jocko, Mont., 1908–
      - Jocko River at Ravalli, Mont., 1906–1911.
        - Middle Fork of Jocko River near Jocko, Mont., 1912–
        - North Fork of Jocko River near Jocko, Mont., 1912–
          - Falls Creek near Jocko, Mont., 1912–
        - Big Knife Creek near Jocko, Mont., 1908–
        - Agency Creek near Jocko, Mont., 1908–
          - Blodgett Creek near Jocko, Mont., 1909–10.
        - Finley Creek near Jocko, Mont., 1908–
          - East Finley Creek near Jocko, Mont., 1908–
            - Indian ditch near Jocko, Mont., 1908–1911; 1912–
        - Valley Creek near Ravalli, Mont., 1908–1911.
      - Revais Creek near Dixon, Mont., 1911–
    - Thompson River near Thompson Falls, Mont., 1911–
    - Prospect Creek near Thompson Falls, Mont., 1911–
    - Priest River at outlet of Priest Lake, at Coolin, Idaho, 1911–
    - Priest River at Falk's ranch, near Priest River, Idaho, 1911–12.
    - Priest River near Priest River, Idaho, 1903–1905; 1910–11.
    - Sullivan Lake near Metaline Falls, Wash., 1912–
    - Sullivan Creek near Metaline Falls, Wash., 1912–
  - Kettle River at Curlew, Wash., 1911–12.
  - Kettle River at Boyds, Wash., 1913–1915.
  - Hall Creek near Inchelium, Wash., 1912–
  - Stranger Creek at Inchelium, Wash., 1914–
  - Cœur d'Alene River, North Fork (head of Cœur d'Alene River and through Cœur d'Alene Lake of Spokane River) at Prichard, Idaho, 1911–1914.
  - Cœur d'Alene River, North Fork, at Enaville, Idaho, 1911–1913.
  - Cœur d'Alene River near Cataldo, Idaho, 1911–12.
  - Cœur d'Alene Lake at Cœur d'Alene, Idaho, 1903–
  - Spokane River at Post Falls, Idaho, 1913–
  - Spokane River at Trent, Wash., 1911–1913.
  - Spokane River at Washington Water Power Co.'s dam, at Spokane, Wash., 1891–1896.
  - Spokane River at Spokane, Wash., 1896–
  - Spokane River near Long Lake, Wash., 1912–
    - Little North Fork of Cœur d'Alene River near Enaville, Idaho, 1911–12.
    - St. Joe River at Avery, Idaho, 1911–
    - St. Joe River near Calder, Idaho, 1911–12.
      - St. Maries River at Lotus, Idaho, 1911–12.
    - Spokane Valley Land & Water Co.'s canal near Post Falls, Idaho, 1911–

Columbia River tributaries—Continued.
- Spokane River tributaries—Continued.
  - Latah (Hangman) Creek at and near Tekoa, Wash., 1904–5.
    - North Fork of Latah Creek near Spokane, Wash., 1904–5.
  - Little Spokane River near Spokane, Wash., 1903–1905; 1911–1913.
- Sanpoil River at Keller, Wash., 1911–
- Nespelem River at Nespelem, Wash., 1911–
- Okanogan River at Okanogan, Wash., 1911–
  - Similkameen River near Oroville, Wash., 1911–
    - Sinlahekin Creek near Loomis, Wash., 1903–1905.
  - Johnson Creek near Riverside, Wash., 1903–1907.
  - Salmon Creek near Conconully, Wash., 1910–
  - Salmon Creek near Okanogan, Wash., 1903–1912.
- Methow River at Winthrop, Wash., 1912.
- Methow River at Pateros, Wash., 1903–
  - Chewack Creek at Winthrop, Wash., 1912–13.
  - Twisp River at Twisp, Wash., 1911–1913.
- Stehekin River (head of Chelan River) at Stehekin, Wash., 1910–
- Chelan Lake at Lakeside, Wash., 1897–1899.
- Chelan Lake at Chelan, Wash., 1905; 1910–
- Chelan River at Chelan, Wash., 1903–
  - Railroad Creek at Lucerne, Wash., 1910–1913.
- Entiat River at Entiat, Wash., 1910–
- Wenatchee River near Leavenworth, Wash., 1910–
- Wenatchee River at Dryden (Cashmere), Wash., 1904–
- Wenatchee River at Wenatchee, Wash., 1897.
  - White River near Chiwaukum, Wash., 1911–12; 1914.
  - Nason Creek near Nason, Wash., 1911.
  - Chiwawa Creek near Leavenworth, Wash., 1911–12; 1913–14.
  - Chiwaukum Creek near Chiwaukum, Wash., 1911.
  - Icicle Creek near Leavenworth, Wash., 1911–14.
  - Peshastin Creek at Blewett, Wash., 1911–12.
  - Peshastin Creek near Leavenworth, Wash., 1911–12.
  - Wenatchee Valley canal at Dryden, Wash. (irrigation seasons only), 1912–
- Crab Creek at Wilson Creek, Wash., 1904.
- Crab Creek at Adrian, Wash., 1910; 1911; 1912.
- Crab Creek near Ephrata, Wash., 1909.
- Moses Lake at Neppel (Moses Lake), Wash., 1909–1914.
- Crab Creek near Warden, Wash., 1909–1912.
- Rockyford Creek near Ephrata, Wash., 1909–1911.
- Keechelus Lake (on Yakima River) near Martin, Wash., 1906–
- Yakima River near Martin, Wash., 1903–
- Yakima River at Easton, Wash , 1904; 1910–1915.
- Yakima River at Cle Elum, Wash., 1906–
- Yakima River at Umtanum, Wash., 1906–
- Yakima River at Selah Gap, near Yakima,[1] Wash., 1897; 1904; 1911; 1912.
- Yakima River at Union Gap, Wash., 1894–1909; 1911–1914.
- Yakima River near Wapato, Wash., 1908–
- Yakima River at Mabton, Wash., 1904–1906; 1911–12.
- Yakima River near Prosser, Wash., 1904–1906; 1913–
- Yakima River at Kiona, Wash., 1895–1915.

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[1] Yakima; city and precinct, Yakima County, Wash.; not North Yakima. Decision of U. S. Geographic Board rendered Jan. 2, 1918.

- Columbia River tributaries—Continued.
  - Yakima River near Richland, Wash., 1906–1911.
    - Cabin Creek near Easton, Wash., 1909–1911.
    - Kachess Lake (on Kachess River) near Easton, Wash., 1905–
    - Kachess River near Easton, Wash., 1903–
    - Big Creek near Cle Elum, Wash., 1909.
    - Cle Elum River, North Fork (head of Cle Elum River), at Galena, Wash., 1907; 1911.
    - Cle Elum Lake near Roslyn, Wash., 1906–
    - Cle Elum River near Roslyn, Wash., 1903–
    - Teanaway River below Forks, near Cle Elum, Wash., 1911–12.
    - Teanaway River near Cle Elum, Wash., 1909–1911; 1912–1914.
    - Swauk Creek near Cle Elum, Wash., 1909–1912.
    - Cascade canal near Ellensburg (Thorp), Wash., 1905–6; 1909–1911.
    - West Kittitas canal near Thorp, Wash., 1904–1906; 1909–1911.
    - Ellensburg Water Co.'s canal near Ellensburg, Wash., 1904–5; 1909–1911.
    - Taneum Creek near Thorp, Wash., 1909–1912.
    - Manastash Creek near Ellensburg, Wash., 1909–1914.
    - Wilson Creek near Thrall, Wash., 1911.
    - Selah Moxee canal near Selah, Wash., 1904–5; 1909–1911.
    - Wenas Creek near Selah, Wash., 1909–1912.
    - Naches River at Anderson's ranch, near Nile, Wash., 1909–1914.
    - Naches River at Oak Flat, near Nile, Wash., 1904–
    - Naches River below Tieton River, near Naches, Wash., 1905; 1909–1912.
    - Naches River near Yakima,[1] Wash., 1893–1897; 1898–1912.
      - Bumping Lake (on Bumping River) near Nile, Wash., 1909; 1910–
      - Bumping River at Bumping Lake, near Nile, Wash., 1906; 1909–
        - American River near Nile, Wash., 1909; 1910; 1911; 1913; 1914; 1915.
      - Selah Valley canal near Naches, Wash., 1904–1906; 1909–1913.
      - Tieton River, North Fork, below Clear Creek, near Naches, Wash., 1914–
      - Tieton River at McAllister Meadows, near Naches, Wash., 1908–1914.
      - Tieton River at headworks of Tieton canal, near Naches, Wash., 1906–
      - Tieton River at Cobb's ranch, near Naches, Wash., 1902–1913.
        - Tieton canal near Naches, Wash., 1910–
      - Wapatox canal near Naches, Wash., 1904–5; 1909–11.
      - Naches Canal Co.'s (Gleed) canal near Naches, Wash., 1904–1906; 1909–1911.
      - Yakima Valley (Congdon) canal near Naches, Wash., 1904–1906; 1909–1911.
      - Naches–Cowiche canal near Naches, Wash., 1904–5; 1909–1911.
      - Yakima[1] power canal near Yakima,[1] Wash., 1904–1906; 1909–10.
        - Schanno canal near Yakima, Wash., 1904–5; 1909–1911.
        - Yakima[1] power waste at Yakima, Wash., 1909–1912.
        - Yakima[1] mill waste at Yakima, Wash., 1909–1912.
          - Naches Avenue Union canal at Yakima, Wash., 1904–1906, 1909–1911.
      - Old Union canal near Yakima, Wash., 1904–1906; 1909–1911.
      - Moxee Co.'s canal near Yakima, Wash., 1904–1906; 1909–1911.
      - Fowler canal near Yakima, Wash., 1904–1906; 1909–1911.
    - Ahtanum Creek, North Fork (head of Ahtanum Creek), near Tampico, Wash., 1907–
    - Ahtanum Creek at The Narrows, near Tampico, Wash., 1908–1913.

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[1] Decision of U. S. Geographic Board; formerly called North Yakima.

- Columbia River tributaries—Continued.
  - Yakima River tributaries—Continued.
    - Ahtanum Creek near Union Gap,[1] Wash., 1904; 1907–1912.
      - South Fork of Ahtanum Creek at Conrad ranch, near Tampico, Wash., 1915–
      - South Fork of Ahtanum Creek near Tampico, Wash., 1907–1914.
    - New Reservation canal near Parker (Union Gap), Wash., 1904–
    - Old Reservation canal near Parker (Wapato), Wash., 1904–
    - Sunnyside canal near Wapato, Wash., 1904–
    - Toppenish Creek near Fort Simcoe, Wash., 1909–
    - Toppenish Creek near White Swan (Wapato), Wash., 1909–1912.
    - Toppenish Creek at railway bridge, near Toppenish, Wash., 1894–1896.
    - Toppenish Creek near Toppenish, Wash., 1908–9.
    - Toppenish Creek at Alfalfa, Wash., 1909–1912.
      - Simcoe Creek near Fort Simcoe, Wash., 1909–
      - Reservation drain at Alfalfa, Wash., 1912–
    - Satus Creek near Toppenish, Wash., 1908–1913.
    - Satus Creek below mouth of Dry Creek, near Toppenish, Wash., 1913–
    - Satus Creek near Alfalfa, Wash., 1905.
    - Satus Creek near Satus, Wash., 1894–1896.
    - Kiona canal near Kiona, Wash., 1904–1906; 1908–1911.
    - Kennewick canal near Richland(Kennewick), Wash., 1904–5; 1910–11.
    - Lower Yakima canal near Kiona, Wash., 1905; 1910–11.
  - Snake River at south boundary at Yellowstone National Park, 1913–
  - Jackson Lake (Snake River) at Moran, Wyo., 1909–10 (fragmentary); 1911–
  - Snake River [2] near Moran, Wyo., 1903–
  - Snake River [2] at Grovont, Wyo., 1899.
  - Snake River [2] near Lyon, Idaho, 1903–1911.
  - Snake River [2] near Heise, Idaho, 1910–
  - Snake River at Idaho Falls, Idaho, 1889–1890; 1892–1894.
  - Snake River near Shelley, Idaho, 1915–
  - Snake River near Firth, Idaho, 1915.
  - Snake River near Blackfoot, Idaho, 1910–
  - Snake River at Neeley, Idaho, 1906–
  - Snake River at Howells Ferry, near Minidoka, Idaho, 1910–
  - Snake River at Montgomery Ferry, near Minidoka, Idaho, 1895–1899; 1901–1910
  - Lake Milner (on Snake River) at Milner, Idaho, 1911–
  - Snake River at Milner, Idaho, 1909–
  - Snake River near Twin Falls, Idaho, 1911–
  - Snake River near Hagerman, Idaho, 1912–
  - Snake River at King Hill, Idaho, 1909–
  - Snake River near Murphy, Idaho, 1912; 1913–
  - Snake River at Weiser, Idaho, 1910–
  - Snake River at Lewiston, Idaho, 1910.
  - Snake River near Burbank, Wash., 1907–
    - Pacific Creek near Moran, Wyo., 1906.
    - Buffalo River near Elk, Wyo., 1906.
    - Henrys Fork [3] at Warm River, Idaho, 1910–1915.
    - Henrys Fork near Ora, Idaho, 1902–1909.
    - Henrys Fork in canyon above Fall River, Idaho, 1890–91.

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[1] Revised decision of U. S. Geographic Board rendered Jan. 2, 1918; formerly called Yakima City.

[2] Decision of United States Geographic Board; formerly called South Fork of Snake River.

[3] Decision of United States Geographic Board; formerly called North Fork of Snake River.

- Columbia River tributaries—Continued.
  - Snake River tributaries—Continued.
    - Henrys Fork near Rexburg, Idaho, 1909–
      - Warm River at Warm River, Idaho, 1912–1915.
        - Robinson Creek at Warm River, Idaho, 1912–1915.
      - Fall River near Marysville, Idaho, 1902–3.
      - Fall River at Fremont, Idaho, 1904–1909 (replace Marysville station).
      - Fall River at Canyon, Idaho, 1890–1901.
      - Teton River near St. Anthony, Idaho, 1903–1909.
      - Teton River at Chase's ranch, Idaho, 1890–1893.
    - Idaho (Government) canal near Shelley, Idaho, 1912–
    - Willow Creek near Prospect, Idaho, 1903–4.
    - Blackfoot River above the reservoir, near Henry, Idaho, 1914–
    - Blackfoot-Marsh reservoir near Henry, Idaho, 1912–
    - Blackfoot River below reservoir, near Henry [near Rossfork], Idaho, 1908–
    - Blackfoot River near Shelley, Idaho, 1909–
    - Blackfoot River near Presto, Idaho, 1903–1909.
    - Blackfoot River near Blackfoot, Idaho, (fragmentary), 1913; 1914; 1915–
      - Little Blackfoot River at Henry, Idaho, 1914–
        - Meadow Creek near Henry, Idaho, 1914–
    - Idaho (Government) canal near Firth, Idaho, 1914–
      - Fort Hall upper canal near Blackfoot, Idaho, 1912–
      - Fort Hall lower canal near Blackfoot, Idaho, 1912–
    - Big Lost River near Chilly, Idaho, 1904–1906; 1907–1915.
    - Big Lost River near Mackay, Idaho, 1903–1906; 1912–1915.
      - Thousand Springs Creek near Chilly, Idaho, 1912–13; 1914.
      - Sharp ditch near Mackay, Idaho, 1912–1914.
      - Streeter ditch near Mackay, Idaho, 1913–1914.
      - Cedar Creek above forks, near Mackay, Idaho, 1911–1913.
      - Cedar Creek below forks, near Mackay, Idaho, 1911–1913.
      - Antelope Creek near Darlington, Idaho, 1913–
      - Little Lost River near Clyde, Idaho, 1910–1913.
      - Birch Creek near Kaufman, Idaho, 1910–1912.
      - Camas Creek near Hamer, Idaho, 1912–13.
    - Portneuf River above reservoir, near Chesterfield, Idaho, 1912–1914.
    - Portneuf diversion channel near Chesterfield, Idaho, 1914.
    - Portneuf River below reservoir, near Chesterfield, Idaho, 1912–1915
    - Portneuf River near Pebble, Idaho, 1910–1913.
    - Portneuf River at Topaz, Idaho, 1913–1915.
    - Portneuf River near McCammon, Idaho, 1896.
    - Portneuf River at Pocatello, Idaho, 1897–1899; 1911–
      - Topons Creek near Chesterfield, Idaho, 1912–1915.
      - Pebble Creek near Pebble, Idaho, 1911–1914.
      - Birch Creek near Downey, Idaho, 1911–1914.
    - Raft River near Bridge, Idaho, 1909–1915.
      - Clear Creek near Naf, Idaho, 1910–11; 1912.
      - Cassia Creek near Conant, Idaho, 1909–1912.
    - North Side Minidoka canal near Minidoka, Idaho, 1909–
    - South Side Minidoka canal near Minidoka, Idaho, 1909–
    - Goose Creek above Trapper Creek, near Oakley, Idaho, 1911–
    - Goose Creek near Oakley, Idaho, 1909–1911.
      - Trapper Creek near Oakley, Idaho, 1911–
      - Birch Creek near Oakley, Idaho, 1912–13; 1914–

- Columbia River tributaries—Continued.
  - Snake River tributaries—Continued.
    - North Side Twin Falls canal at Milner, Idaho, 1909–
    - South Side Twin Falls canal at Milner, Idaho, 1909–
    - Big Cottonwood Creek near Oakley, Idaho, 1909–
    - Dry Creek near Artesian City, Idaho, 1912.
    - Rock Creek near Rock Creek, Idaho, 1909–1913.
      - McMullen Creek near Rock Creek, Idaho, 1910; 1912.
    - Salmon Falls Creek above upper Vineyard ditch, near Contact, Nev., 1914.
    - Salmon Falls Creek below upper Vineyard ditch, near Contact, Nev., 1914.
    - Salmon Falls Creek below High Line canal, near San Jacinto, Nev., 1914.
    - Salmon Falls Creek near San Jacinto, Nev., 1909–
    - Salmon Falls Creek near Twin Falls, Idaho, 1909–10.
      - Upper Vineyard ditch near Contact, Nev., 1914.
      - Lower Vineyard ditch near Contact, Nev., 1914.
      - Jakes Creek above Hubbard ranch, near Contact, Nev., 1914.
      - Jakes Creek below Hubbard ranch, near Contact, Nev., 1914.
      - Willow Creek near Contact, Nev., 1914.
      - Bird's Nest ditch near Contact, Nev., 1914.
      - Harrell ditch near Contact, Nev., 1914.
      - High Line ditch near San Jacinto, Nev., 1914.
      - San Jacinto ditch near San Jacinto, Nev., 1914.
      - Island ditch near San Jacinto, Nev., 1914.
      - West Boar's Nest ditch near San Jacinto, Nev., 1914.
      - Trout Creek near San Jacinto, Nev., 1914.
      - East Boar's Nest ditch near San Jacinto, Nev., 1914.
      - Shoshone Creek near San Jacinto, Nev., 1914–15.
        - North Side ditch near San Jacinto, Nev., 1914.
      - Cedar Creek near Roseworth, Idaho, 1909–
      - Devil Creek near Three Creek, Idaho, 1912–1914.
    - Big Wood River near Gimlet, Idaho, 1904–5.
    - Big Wood River at Hailey, Idaho, 1889; 1915–
    - Big Wood Slough at Hailey, Idaho, 1915–
    - Big Wood River near Bellevue, Idaho, 1911–
    - Big Wood River below Magic dam, near Richfield, Idaho, 1911–
    - Big Wood River below North Gooding canal, near Shoshone, Idaho, 1911; 1912–
    - Big Wood River near Shoshone, Idaho, 1905–6; 1908–1913.
    - Big Wood River at Toponis, Idaho, 1896–1899.
    - Big Wood River near Bliss, Idaho, 1899.
      - Camas Creek near Blaine, Idaho, 1912–
      - Little Wood River near Carey, Idaho, 1904–5.
      - Little Wood River near Richfield, Idaho, 1911–
      - Little Wood River at Toponis [Gooding], Idaho, 1896–1899.
      - Dry Creek near Blanche, Idaho, 1911–1914.
    - King Hill Creek near King Hill, Idaho, 1913.
    - Little Canyon Creek at Glenns Ferry, Idaho, 1909–1913.
    - Alkali Creek near Glenns Ferry, Idaho, 1909–1913.
    - Cold Springs Creek near Hammett, Idaho, 1909–1913.
    - Bennett Creek near Hammett, Idaho, 1909–1913.
    - Bruneau River near Rowland, Nev., 1913–
    - Bruneau River near Tindall, Idaho, 1910–1912.
    - Bruneau River near Hot Spring, Idaho, 1909–1915.

- Columbia River tributaries—Continued.
  - Snake River tributaries—Continued.
    - Bruneau River near Grandview, Idaho, 1895–1903; 1909–
      - Sheep Creek near Tindall, Idaho, 1910–1913.
      - Marys Creek near Owyhee, Nev., 1913–1915.
      - Marys Creek at Tindall, Idaho, 1910–1913.
      - Louse Creek near Wickahoney, Idaho, 1911.
      - East Fork of Bruneau River near Three Creek, Idaho, 1912–1914.
      - East Fork of Bruneau River near Hot Spring, Idaho, 1910–1915.
        - Three Creek near Three Creek, Idaho, 1912–1914.
          - Cherry Creek near Three Creek, Idaho, 1912–1914.
          - Deadwood Creek near Three Creek, Idaho, 1912–1914.
      - Buckaroo ditch at Hot Spring, Idaho, 1912–1914.
      - Grandview canal near Grandview, Idaho, 1912–1915.
    - Castle Creek near Castle Creek, Idaho, 1910–11.
    - Sucker Creek near Homedale, Idaho, 1903–1910.
    - Owyhee River at Mountain City, Nev., 1913.
    - Owyhee River near Owyhee, Nev., 1913–
    - Owyhee River at Owyhee, Oreg., 1890–1896; 1903–
      - South Fork of Owyhee River near Tuscarora, Nev., 1913.
      - Jack Creek near Tuscarora, Nev., 1913–
      - Jordan Creek near Jordan Valley, Oreg., 1911–
        - Cow Creek at Narrows, near Jordan Valley, Oreg., 1914.
        - Cow Creek at mouth, near Jordan Valley, Oreg.. 1914.
      - Owyhee canal near Owyhee, Oreg., 1904–5; 1911–
    - Boise River near Twin Springs, Idaho, 1911–
    - Boise River at Dowling's ranch, near Arrowrock, Idaho, 1911–
    - Boise River near Highland, Idaho (replaces the Boise station), 1905–1915
    - Boise River near Boise, Idaho, 1894–1904.
    - Boise River at Caldwell, Idaho, 1895–96.
      - Cottonwood Creek near Arrowrock, Idaho, 1914–
      - South Fork of Boise River near Lenox, Idaho, 1911–
      - Little Camas Creek, near Little Camas Store, Idaho, 1896.
      - Moore Creek near Arrowrock, Idaho, 1915–
        - Grimes Creek near Centerville, Idaho, 1910.
      - Dry Creek:
        - Spring Creek near Boise, Idaho, 1911–12.
    - Wilson ditch near Ontario, Oreg., 1904–5.
    - Malheur River near Drewsey, Oreg., 1914.
    - Malheur River at Warmsprings reservoir site, near Riverside, Oreg., 1914–
    - Malheur River above South Fork, at Riverside, Oreg., 1906–7; 1908–1910.
    - Malheur River at Riverside, Oreg., 1909–1915.
    - Malheur River near Namorf, Oreg., 1913–
    - Malheur River near Harper ranch, near Westfall, Oreg., 1903–1905.
    - Malheur River near Little Valley, Oreg., 1914.
    - Malheur River at McLaughlin bridge, near Vale, Oreg., 1904–1906.
    - Malheur River at Vale, Oreg., 1890–91; 1895–96; 1903–1914.
    - Malheur River at Halliday bridge, near Ontario, Oreg., 1904–5.
    - Malheur River near Ontario, Oreg., 1903–4.
      - South Fork of Malheur River at Riverside, Oreg., 1910–1913; 1913–1915.
      - North Fork of Malheur River at Scotts ranch, near Beulah, Oreg., 1914.
      - North Fork of Malheur River at Foley's ranch, near Beulah, Oreg., 1909–1912; 1913–14.
      - Vines ditch near Little Valley, Oreg., 1904–5; 1914.

- Columbia River tributaries—Continued.
  - Snake River tributaries—Continued.
    - Malheur River tributaries—Continued.
      - Malheur Farmers' canal above Vale, Oreg., 1904–5.
      - McLaughlin ditch above Vale, Oreg., 1904–5.
      - "J. H." ditch above Vale, Oreg., 1904–5.
      - Gellerman & Frohman ditch above Vale, Oreg., 1904–5.
      - Sand Hollow ditch above Vale, Oreg., 1904–5.
      - Bully Creek near Westfall, Oreg., 1911; 1912–13.
      - Bully Creek at Warm Springs, near Vale, Oreg., 1903–4; 1905–1907; 1911–
      - Bully Creek at Vale, Oreg., 1904–5.
      - Hope Mill ditch at Vale, Oreg., 1904–5.
      - Willow Creek near Malheur, Oreg., 1904–6; 1910–11; 1912–
      - Willow Creek near Brogan, Oreg., 1910–
      - Willow Creek at Dell, Oreg., 1904–1906.
        - Cow Creek near Brogan, Oreg., 1912–1914.
        - Pole Creek near Brogan, Oreg., 1912–13.
      - Nevada ditch below Vale, Oreg., 1904–5.
    - Payette River near Horseshoe Bend, Idaho, 1906–
    - Payette River at Payette, Idaho, 1895–1897.
      - North Fork of Payette River at Lardo, Idaho, 1908–
      - North Fork of Payette River at Van Wyck, Idaho, 1912–
        - Lake Fork of Payette River near McCall, Idaho, 1909–1914.
      - Shafer Creek near Horseshoe Bend, Idaho, 1911–12.
        - Harris Creek near Horseshoe Bend, Idaho, 1911–12.
    - Weiser River near Weiser, Idaho, 1890–91; 1894–1904; 1910–1915.
      - Weiser River, West Fork, near Fruitvale, Idaho, 1910–1913.
        - Lost Creek near Tamarack, Idaho, 1910–1914.
      - Middle Fork of Weiser River at Middle Fork, Idaho, 1910–1913.
        - Sage Creek near Midvale, Idaho, 1913.
        - Sommercamp Creek near Midvale, Idaho, 1913.
        - Miller Creek near Midvale, Idaho, 1913.
      - Crane Creek near Midvale, Idaho, 1910–
      - Mann Creek near Weiser, Idaho, 1911–1913.
      - Monroe Creek (upper station) near Weiser, Idaho, 1911–12.
      - Monroe Creek (lower station) near Weiser, Idaho, 1911–1913.
    - Burnt River, North Fork (head of Burnt River), near Audrey, Oreg., 1915–
    - Burnt River near Hereford, Oreg., 1915–
    - Burnt River near Bridgeport, Oreg., 1915–
      - Middle Fork of Burnt River near Audrey, Oreg., 1915.
      - South Fork of Burnt River near Unity, Oreg., 1915–
        - Sawmill Creek near Unity, Oreg., 1915.
      - Camp Creek near Hereford, Oreg., 1915.
    - Powder River at Salisbury, Oreg., 1903–1914.
    - Powder River at Baker, Oreg., 1913; 1914.
    - Powder River near North Powder, Oreg., 1909–1912; 1913–
      - Baldock Slough at Baker, Oreg., 1913; 1914.
      - Old Settlers Slough at Baker, Oreg., 1913; 1914.
      - Pine Creek near Baker, Oreg., 1913; 1914.
        - Goodrich Creek near Baker, Oreg., 1913.
          - Mill Creek near Baker, Oreg., 1913; 1914.
            - Lee-Polly ditch near Baker, Oreg., 1914.
            - Marble Creek near Baker, Oreg., 1913; 1914.
        - Salmon Creek near Baker, Oreg., 1913; 1914.

- Columbia River tributaries—Continued.
  - Snake River tributaries—Continued.
    - Powder River tributaries—Continued.
      - Willow Creek near Haines, Oreg., 1913.
      - North Powder River at Gardner's ranch, near North Powder, Oreg., 1912.
      - North Powder River at North Powder, Oreg., 1912; 1913; 1914.
        - Anthony Creek near North Powder, Oreg., 1912.
      - Wolf Creek near North Powder, Oreg., 1913; 1914.
      - Big Creek near Medical Springs, Oreg., 1913; 1914.
      - Goose Creek near Keating, Oreg., 1913; 1914.
      - Eagle Creek above West Fork, near Baker, Oreg., 1911.
      - Eagle Creek near Baker, Oreg., 1909–10.
      - Eagle Creek near New Bridge, Oreg., 1910–11; 1914.
        - West Fork of Eagle Creek near Baker, Oreg., 1911.
      - Daly Creek near Richland, Oreg., 1913.
    - Salmon River near Pierson, Idaho, 1911–1913
    - Salmon River at Salmon, Idaho, 1912–
    - Salmon River at Whitebird, Idaho, 1910–
      - Lake Creek near Stanley, Idaho, 1910–1913.
      - Valley Creek near Stanley, Idaho, 1910–1913.
      - Pahsimeroi River near Goldburg, Idaho, 1910–1913.
      - Pahsimeroi River below the sinks, near Goldburg, Idaho, 1913.
        - Goldburg Creek near Goldburg, Idaho, 1910; 1913.
        - Big Creek near Patterson, Idaho, 1910–1913.
      - Lemhi River:
        - Timber Creek near Leadore, Idaho, 1912.
          - West Fork of Timber Creek near Leadore, Idaho, 1912.
        - Eightmile Creek near Leadore, Idaho, 1912.
      - North Fork of Salmon River near North Fork, Idaho, 1912.
    - Grande Ronde River at Hilgard, Oreg., 1903–1915.
    - Grande Ronde River at Elgin, Oreg., 1903–1912.
    - Grande Ronde River at Zindel, Wash., 1904–1912.
      - Catherine Creek near Union, Oreg., 1906–7; 1911–12; 1915.
        - Little Creek near Union, Oreg., 1915.
      - Mill Creek near Summerville, Oreg., 1914–15.
      - Wallowa Lake (on Wallowa River) near Joseph, Oreg., 1905–6; 1912–1914; 1915.
      - Wallowa River at Joseph, Oreg., 1903-1914; 1915.
      - Wallowa River near Wallowa, Oreg., 1903–1907.
      - Wallowa River at Minam (near Elgin), Oreg., 1903–1914.
        - Silver Lake ditch near Joseph, Oreg., 1905; 1915.
        - Farmers' and Citizens' ditch near Joseph, Oreg., 1905; 1915.
        - Granger ditch at Joseph, Oreg., 1905; 1915.
        - Big Bend ditch at Joseph, Oreg., 1905; 1915.
        - Hurricane Creek near Joseph, Oreg., 1915.
        - Lostine River near Lostine, Oreg., 1912–1914; 1915.
        - Company ditch near Wallowa, Oreg., 1905.
        - Bear Creek near Wallowa, Oreg., 1915.
        - Minam River at Minam, Oreg., 1912–1914.
    - Asotin Creek near Shelmans ranch, near Asotin, Wash., 1904-1906.
    - Asotin Creek near Asotin, Wash., 1904–5; 1910; 1911.
    - Selway River (head of Clearwater River), near Lowell, Idaho, 1911–12.
    - Clearwater River at Kamiah, Idaho, 1910–

- Columbia River tributaries—Continued.
  - Snake River tributaries—Continued.
    - Clearwater River at Lewiston, Idaho, 1910–1913.
      - Lochsa River near Lowell, Idaho, 1910–1912.
      - South Fork of Clearwater River near Grangeville, Idaho, 1910–
      - South Fork of Clearwater River at Kooskia, Idaho, 1910–1912.
      - Lolo Creek near Greer, Idaho, 1911–12.
    - Tucannon River near Pomeroy, Wash., 1913–1915.
    - Tucannon River near Starbuck, Wash., 1914–
    - Palouse River near Potlatch, Idaho, 1914–
    - Palouse River at Elberton, Wash., 1904–5.
    - Palouse River near Winona, Wash., 1915–
    - Palouse River at Hooper, Wash., 1897–
      - Rock Creek near Ewan (St. John), Wash., 1903–1905; 1914–
      - Cow Creek near Keystone, Wash., 1904–5.
      - Cow Creek near Hooper, Wash., 1904.
  - Walla Walla River near Milton, Oreg., 1903–1908.
  - Walla Walla River at Whitman, Wash., 1897–1899.
    - South Fork of Walla Walla River near Milton, Oreg., 1906; 1907–
    - South Fork of Walla Walla River near Milton, Oreg. (lower station), 1903–1906.
    - Mill Creek near Walla Walla, Wash., 1913–
  - Umatilla River at Gibbon, Oreg., 1896–1911.
  - Umatilla River at Pendleton, Oreg., 1891–2; 1903–1905.
  - Umatilla River above Furnish reservoir, near Yoakum, Oreg., 1915–
  - Umatilla River at Yoakum, Oreg., 1903–
  - Umatilla River near Umatilla, Oreg., 1903–
    - North Fork of Umatilla River near Gibbon, Oreg., 1912–
    - McKay Creek near Pendleton, Oreg., 1903–4.
    - Farmers' mill ditch at Pendleton, Oreg., 1905.
    - Slusher & Gould ditch near Nolin, Oreg., 1905–6.
    - Lisle & Crane ditch near Echo, Oreg., 1905.
    - Charles Lisle ditch at Echo, Oreg., 1905–6.
    - Henrietta mill ditch at Echo, Oreg., 1905–6.
    - Wilson & Co.'s ditch at Echo, Oreg., 1905–6.
    - Allen ditch at Echo, Oreg., 1905–6.
    - Western Land & Irrigation Co.'s (Hinkle) ditch at Echo, Oreg., 1905–6.
    - Pioneer ditch at Echo, Oreg., 1905–6.
    - Maxwell ditch at Echo, Oreg., 1905–6.
    - Maxwell Land & Irrigation Co.'s (Hermiston) ditch near Hermiston, Oreg., 1905–6.
    - Beitle ditch near Hermiston, Oreg., 1905–6.
    - Oregon Land & Water Co.'s ditch at Umatilla, Oreg., 1905–6.
    - Brownell ditch at Umatilla, Oreg., 1905–6.
  - Willow Creek near Arlington, Oreg., 1905–6.
  - Rock Creek near Goldendale, Wash., 1911–13.
    - Squaw Creek near Goldendale, Wash., 1911–13.
  - John Day River near Dayville, Oreg., 1908–1914.
  - John Day River at Clarno, Oreg., 1914–15
  - John Day River at McDonald, Oreg., 1904–
    - South Fork of John Day River at Dayville, Oreg., 1908–1914.
      - Dayville ditch at Dayville, Oreg., 1910–1914.
    - Camas Creek above Cable Creek, near Ukiah, Oreg., 1914–
    - Camas Creek below Cable Creek, near Ukiah, Oreg., 1914.
      - Cable Creek near Ukiah, Oreg., 1914–
    - Rock Creek at Rockcreek, Oreg., 1905; 1911.

- Columbia River tributaries—Continued.
  - Deschutes River at Crane Prairie, near Lapine, Oreg., 1914–
  - Deschutes River at Forest Service bridge, near Lapine, Oreg., 1910; 1912; 1913–
  - Deschutes River near Lava, Oreg., 1905–1907; 1909–1911; 1912; 1913–
  - Deschutes River at West's ranch, near Lava, Oreg., 1906–1909; 1914.
  - Deschutes River at Benham Falls, Oreg., 1909–1914.
  - Deschutes River at Lava Island, Oreg., 1915–
  - Deschutes River at Bend, Oreg., 1904–
  - Deschutes River below Bend, Oreg., 1914–
  - Deschutes River at Tumalo [Laidlaw], Oreg., 1909–1912; 1914–
  - Deschutes River near Cline Falls, Oreg., 1910–11; 1912–13.
  - Deschutes River near Mecca, Oreg., 1911–
  - Deschutes River at Sherar, Oreg., 1912–1914.
  - Deschutes River at Moro, Oreg., 1897–1899.
  - Deschutes River at Moody (Biggs), Oreg., 1906–
    - Odell Creek near Crescent, Oreg., 1911; 1912; 1913; 1914.
    - Fall River near Lapine, Oreg., 1912.
    - East Fork at Crescent, Oreg., 1904–1908; 1910–11; 1913–14.
    - East Fork at Morson's intake, near Lapine, Oreg., 1914–
    - East Fork near Lapine, Oreg., 1910–1913.
    - East Fork at Allen's ranch, near Lava, Oreg., 1905–1912; 1913–1915.
      - Crescent Creek at outlet of Crescent Lake, near Crescent, Oreg., 1911; 1912–
      - Crescent Creek below Cold Creek, near Crescent, Oreg., 1912–13.
      - Crescent Creek near Crescent, Oreg., 1912–13; 1914.
      - Big Marsh Creek near Crescent, Oreg., 1912–1914.
    - Arnold canal near Bend, Oreg., 1914–
    - Central Oregon canal near Bend, Oreg., 1905–
    - Pilot Butte canal near Bend, Oreg., 1905–
    - North canal near Bend, Oreg., 1913–
    - Swalley canal near Bend, Oreg., 1913–
    - Tumalo Creek near Tumalo [Laidlaw], Oreg., 1906–1914.
    - Tumalo Creek near Bend, Oreg., 1906–
      - Lewis Creek near Tumalo [Laidlaw], Oreg., 1908–9.
      - Wimer canal near Tumalo [Laidlaw], Oreg., 1906–1914.
      - Columbia Southern canal near Tumalo [Laidlaw], Oreg., 1906–1914.
      - Tumalo feed canal near Bend, Oreg., 1914–
    - Squaw Creek near Sisters, Oreg., 1906–
      - McAllister's ditch near Sisters, Oreg., 1909–1913.
    - Crooked River near Post, Oreg., 1908–1911.
    - Crooked River at Hoffman's ranch, near Prineville, Oreg., 1913–14.
    - Crooked River near Prineville, Oreg., 1908–1912.
    - Crooked River at Prineville, Oreg., 1914.
      - Prineville flour mill tailrace at Prineville, Oreg., 1914.
      - Ochoco Creek near Howard, Oreg., 1910–11.
      - Ochoco Creek at Elliot's ranch, near Prineville, Oreg., 1908–1910; 1914–
      - Ochoco Creek at Prineville, Oreg., 1912; 1913–1915
        - Tableland ditch near Prineville, Oreg., 1915–
        - Elliot ditch near Prineville, Oreg., 1908–1910; 1914–
      - McKay Creek near Prineville, Oreg., 1915–
    - Metolius River at Allingham ranger station, near Sisters, Oreg., 1910–1913 1915.
    - Metolius River at Hubbard's ranch, near Grandview, Oreg., 1910–1913.

- Columbia River tributaries—Continued.
  - Deschutes River tributaries—Continued.
    - Metolius River at Rigg's ranch, near Sisters, Oreg., 1908–1912.
      - Lake Creek near Sisters, Oreg., 1911–1913; 1915–
      - First Creek, near Sisters, Oreg., 1915–
      - Jack Creek near Sisters, Oreg., 1915–
      - Canyon Creek near Sisters, Oreg., 1915–
      - Whitewater River near Grandview, Oreg., 1911–1913.
    - Shitike Creek at Warmspring, Oreg., 1911–
    - Trout Creek near Antelope, Oreg., 1915.
    - Trout Creek near Gateway, Oreg., 1915.
      - Hay Creek near Hay Creek, Oreg., 1915.
    - Warm Springs River near Warmspring, Oreg., 1911–
    - Mill Creek near Warmspring, Oreg., 1915.
    - White River near Tygh Valley, Oreg., 1911–
      - Tygh Creek at Tygh Valley, Oreg., 1911–1913.
  - Klickitat River above Pearl Creek, near Glenwood, Wash., 1910.
  - Klickitat River above Big Muddy Creek, Wash., 1905.
  - Klickitat River below Big Muddy Creek, Wash., 1905; 1907–8.
  - Klickitat River at Camp Klickitat, Wash., 1907–1908.
  - Klickitat River near Glenwood, Wash., 1909–
  - Klickitat River below Glenwood, Wash., 1914.
  - Klickitat River at Hanson's cable, near Klickitat, Wash., 1908–9.
  - Klickitat River at Klickitat (Wright), Wash., 1909–1912.
  - Klickitat River at Wols Ferry, near Lyle, Wash., 1907–1910.
  - Klickitat River at Lyle, Wash., 1912.
    - West Fork of Klickitat River near Glenwood, Wash., 1910.
    - Big Muddy River above mouth of Cougar Creek, near Wright, Wash., 1905; 1908.
    - Little Klickitat River near Goldendale, Wash., 1910–1912.
  - Hood River at Dee, Oreg., 1913–
  - Hood River at Winans, Oreg., 1905–1907; 1910–1912; 1913.
  - Hood River at Tucker Bridge, Oreg., 1897–1899; 1913–
  - Hood River at Powerdale, near Hood River, Oreg., 1913–
    - East Fork of Hood River above intake, near Mount Hood, Oreg., 1915–
    - East Fork of Hood River near Mount Hood, Oreg., 1913–14.
      - East Fork irrigation district canal near Mount Hood, Oreg., 1913–
    - West Fork of Hood River near Dee, Oreg., 1913–
    - Pacific Light & Power Co. tailrace near Hood River, Oreg., 1914.
  - White Salmon River at splash dam near Trout Lake, Wash., 1912–
  - White Salmon River at Husum, Wash., 1909–
  - White Salmon River at Condit dam, near Underwood, Wash., 1912–13.
    - Trout Creek at Guler, Wash., 1909–1911.
  - Little White Salmon River below Lava Creek, near Cook, Wash., 1903–1906.[1]
  - Little White Salmon River near Cooks, Wash., 1909.
  - Latourell Creek at Latourell, Oreg., 1912–13.
  - Sandy River above Salmon River, at Brightwood, Oreg., 1910–1914.
  - Sandy River below Salmon River, near Brightwood, Oreg., 1907–1911.
  - Sandy River near Marmot, Oreg., 1911–
  - Sandy River above Bull Run River, near Bull Run, Oreg., 1910–1912.

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[1] Records published in U. S. Geol. Survey Water-Supply Paper 272, pp. 428–429.

- Columbia River tributaries—Continued.
  - Sandy River below Bull Run River, near Bull Run, Oreg., 1910–1914.
    - Clear Fork of Sandy River near Welches, Oreg., 1913; 1914–15.
    - Lost Creek near Brightwood, Oreg., 1913–
    - Still Creek near Rowe, Oreg., 1910–1912.
    - Salmon River near Rowe, Oreg., 1910–1912.
    - Salmon River at Welches, Oreg., 1913–14.
    - Salmon River at Fish Hatchery, near Brightwood, Oreg., 1912–13.
    - Bull Run River near Bull Run, Oreg., 1895–
      - Little Sandy River near Marmot, Oreg., 1913–
      - Little Sandy River near Bull Run, Oreg., 1911–1913.
        - Little Sandy flume near Bull Run, Oreg., 1912–13.
  - Willamette River, Middle Fork (head of Willamette River), above Salt Creek, near Oakridge, Oreg., 1913–14.
  - Willamette River, Middle Fork, below North Fork, near Oakridge, Oreg., 1911–12.
  - Willamette River, Middle Fork, at Jasper, Oreg., 1905–1912; 1913–
  - Willamette River at Springfield, Oreg., 1911–1913.
  - Willamette River at Albany, Oreg., 1878–1880; 1892–
  - Willamette River at Salem, Oreg., 1909–
  - Willamette River at Oregon City, Oreg., 1909–1912.
    - Salt Creek near Oakridge, Oreg., 1913–14.
    - Salmon Creek near Oakridge, Oreg., 1913–
    - North Fork of Middle Fork of Willamette River near Oakridge (Hazeldell), Oreg., 1909–1912; 1913–
    - Fall Creek near Fall Creek, Oreg., 1911.
    - Coast Fork of Willamette River near Goshen, Oreg., 1905–1912.
      - Row River near Disston, Oreg., 1910–1913.
    - McKenzie River at Clear Lake, Oreg., 1912–1915.
    - McKenzie River at McKenzie Bridge, Oreg., 1910–
    - McKenzie River at Martins Rapids, Oreg., 1910–11.
    - McKenzie River near Springfield, Oreg., 1905–1915.
      - Eugene power canal near Walterville, Oreg., 1912–1915.
    - North Santiam River near Hoover, Oreg., 1910–13.
    - North Santiam River at Detroit, Oreg., 1907–1909.
    - North Santiam River at Niagara, Oreg., 1908–
    - North Santiam River at Mehama, Oreg., 1905–1907; 1910–1914.
    - Santiam River at Jefferson, Oreg., 1905–6; 1908–
      - Marion Fork of Santiam River at Marion Lake, near Hoover, Oreg., 1907; 1909–1912.
        - Puzzle Creek near Detroit (Hoover), Oreg., 1907; 1909.
          - North Fork of Puzzle Creek near Hoover, Oreg., 1909–1912.
          - South Fork of Puzzle Creek near Hoover, Oreg., 1909–1912.
      - Pamelia Creek near Detroit, Oreg., 1907; 1909; 1913.
      - Whitewater Creek near Detroit, Oreg., 1907; 1913.
      - Breitenbush Creek near Detroit, Oreg., 1910–1913.
      - South Santiam River near Cascadia, Oreg., 1910–1913.
      - South Santiam River near Foster, Oreg., 1911.
      - South Santiam River at Waterloo, Oreg., 1905–1907; 1910–11.
        - Middle Santiam River near Foster, Oreg., 1911.
    - Luckiamute River near Suver, Oreg., 1905–1911.
    - Yamhill River, South Fork (head of Yamhill River), at Sheridan, Oreg., 1906–1913.
    - Yamhill River at La Fayette, Oreg., 1908–1914.

Columbia River tributaries—Continued.
  Willamette River tributaries—Continued.
    Molalla River near Molalla, Oreg., 1905-1909-
    Clackamas River near Cazadero, Oreg., 1909-
    Clackamas River at Estacada, Oreg., 1908-1911.
    Clackamas River near Barton, Oreg. (replaced by Estacada station), 1905 1908.
    Clackamas River at Park Place, Oreg., 1911-12.
      Oak Grove Fork of Clackamas River at Timothy Meadows, near Cazadero, Oreg., 1913-
      Oak Grove Fork of Clackamas River at intake, near Cazadero, Oreg. 1909-
  Lewis River above Muddy River near Cougar, Wash., 1909.
  Lewis River near Cougar, Wash., 1909-1912.
  Lewis River near Amboy, Wash., 1911-
  Lewis River at Ariel, Wash., 1909.
    Muddy River at mouth, near Cougar, Wash., 1909.
    Pine Creek at mouth, near Cougar, Wash., 1909.
    Swift Creek at mouth, near Cougar, Wash., 1909.
  Kalama River near Kalama, Wash., 1911-1913.
  Ohanapecosh River near Lewis, Wash., 1907-
  Cowlitz River at Lewis, Wash., 1911-
  Cowlitz River at Mossy Rock, Wash., 1912-
  Cowlitz River at Randle, Wash., 1910-1912.
  Cowlitz River at Mayfield, Wash., 1910-11.
    Clear Fork near Lewis, Wash., 1907-
    Coal Creek near Lewis, Wash., 1911-
    Lake Creek at outlet of Packwood Lake, near Lewis, Wash., 1911-
    Lake Creek at mouth, near Lewis, Wash., 1907-
    Johnson Creek below West Fork, near Lewis, Wash., 1911; 1913-14.
    Johnson Creek at mouth, near Lewis, Wash., 1907-1914.
    Glacier Creek near Lewis, Wash., 1911.
    Hagar Creek near Lewis, Wash., 1911-12; 1913-14.
      North Fork of Hagar Creek near Lewis, Wash., 1911-12; 1913-14.
    Cispus River near Randle, Wash., 1910-1912.
    Toutle River at St. Helen, Wash., 1909.
    Toutle River near Castle Rock, Wash., 1909-1912.

STREAMS BETWEEN COLUMBIA RIVER AND KLAMATH RIVER.

Rogue River near Prospect, Oreg., 1907-1912.
Rogue River below Prospect, Oreg., 1913-
Rogue River near Trail, Oreg., 1910-1913.
Rogue River near Tolo, Oreg., 1905-
Rogue River near Galice, Oreg., 1906.
  Mill Creek near Prospect, Oreg., 1910.
  Butte Creek, South Fork (head of Butte Creek), at Butte Falls, Oreg., 1910-11 1915-
  Little Butte Creek, South Fork (head of Little Butte Creek), near Lake Creek Oreg., 1910-1913.
  Little Butte Creek near Eagle Point, Oreg., 1907-
    Rogue River Valley canal at intake, near Lake Creek, Oreg., 1914; 1915-
    Rogue River Valley canal near Brownsboro, Oreg., 1913; 1915.
    North Fork of Little Butte Creek, near Lake Creek, Oreg., 1911-1913.

- Rogue River tributaries—Continued.
    - Bear Creek at Talent, Oreg., 1907–1914.
    - Bear Creek at Medford, Oreg., 1915–
        - Neil Creek near Ashland, Oreg., 1913.
            - George Dunn ditch near Ashland, Oreg., 1913.
        - Ashland Creek at Ashland, Oreg., 1913.
        - Wagner Creek near Talent, Oreg., 1913.
    - Evans Creek at Wimer, Oreg., 1913.
    - Applegate River near Buncom, Oreg., 1911–1914.
    - Applegate River at Murphy, Oreg., 1907–1910.
        - Cameron ditch near Buncom, Oreg., 1911–1914.
        - East Fork of Little Applegate River near Buncom, Oreg., 1913.
        - Little Applegate River near Ruch, Oreg., 1913.
            - West Fork of Little Applegate River near Buncom, Oreg., 1913.
                - Spicer ditch near Buncom, Oreg., 1913.
            - Thompson Creek near Applegate, Oreg., 1913.
            - Slate Creek at Wonder, Oreg., 1913.
        - Grave Creek near Placer, Oreg., 1913.
- South Umpqua River (head of Umpqua River) near Tiller, Oreg., 1910–11.
- South Umpqua River near Brockway, Oreg., 1905–1912.
- Umpqua River near Elkton, Oreg., 1905–
    - Cow Creek at Riddle, Oreg., 1911–12.
    - North Umpqua River at Tokeetee Falls, near Hoaglin, Oreg., 1908–1909; 1914–
    - North Umpqua River near Hoaglin, Oreg., 1910–1912; 1914–
    - North Umpqua River near Oakcreek, Oreg., 1905–1908; 1913–1915.
    - North Umpqua River at Winchester, Oreg., 1908–1913.
    - Calapooya Creek near Sutherlin, Oreg., 1912–13.
        - Luse canal near Sutherlin, Oreg., 1912–13.
    - Mill Creek near Ash, Oreg., 1907–1912; 1915–
- Siletz River at Siletz, Oreg., 1905–1912.
- Wilson River near Tillamook, Oreg., 1915–
    - North Fork of Wilson River near Tillamook, Oreg., 1913–1915.
- Nehalem River at Salmonberry, near Balm, Oreg., 1913–14.

REPORTS ON WATER RESOURCES OF THE NORTH PACIFIC SLOPE DRAINAGE BASINS.

PUBLICATIONS OF UNITED STATES GEOLOGICAL SURVEY.

WATER-SUPPLY PAPERS.

Water-supply papers are distributed free by the Geological Survey as long as its stock lasts. An asterisk (*) indicates that this stock has been exhausted. Many of the papers marked in this way may, however, be purchased (at price noted) from the SUPERINTENDENT OF DOCUMENTS, Washington, D. C. Omission of the price indicates that the report is not obtainable from Government sources. Water-supply papers are of octavo size.

*4. A reconnaissance in southeastern Washington, by I. C. Russell, 1897. 96 pp., 7 pls. 15c.

Describes an area "bordered on the south by Oregon, on the east by Idaho, on the north by Snake River, and on the west by the Columbia," and "briefly designated as lying south of Snake River"; discusses climate, vegetation, topography and drainage, geologic formations—including the river terraces and soils—irrigation, and the artesian water supply, and gives an outline of the geological history of the region.

*44. Profiles of rivers in the United States, by Henry Gannett. 1901. 100 pp., 11 pls. 15c.

Gives elevations and distances along Columbia, Willamette, Flathead, and Snake rivers.

*53. Geology and water resources of Nez Percè County, Idaho, Part I, by I. C. Russell. 1901. 85 pp., 10 pls. 10c.

*54. Geology and water resources of Nez Perce County, Idaho, Part II, by I. C. Russell. 1901. 55 pp. (87-141).

Nos. 53 and 54 relate to an area "in western Idaho, bordered on the west by portions of Washington and Oregon," drained through Snake River to the Columbia; they describe the topography, geology, and soils of the region, discuss the relation of the surface features—plateaus, canyons, streams, etc.—to the geology and the climate, the source and quantity of the water supply, including springs and artesian wells, and refer briefly to the occurrence of building stones, lignite, gold, silver, and copper. They include also a short bibliography of artesian waters and two appendixes—one giving list of elevations, and the other notes concerning Portland cement.

55. Geology and water resources of a portion of Yakima County, Wash., by G. O. Smith. 1901. 68 pp., 7 pls. 10c.

Describes topography, climate, soil, agriculture, geology, and surface and ground waters of an area comprising about 50 square miles in the vicinity of North Yakima; discusses in some detail the artesian basins and wells.

*57. Preliminary list of deep borings in the United States, Part I (Alabama-Montana), by N. H. Darton. 1902. 60 pp. 5c.

*61. Preliminary list of deep borings in the United States, Part II (Nebraska-Wyoming), by N. H. Darton. 1902. 67 pp. 5c.

Nos. 57 and 61 contain information as to depth, diameter, yield, and head of water in borings more than 400 feet deep; under head "Remarks" gives information concerning temperature, quality of water, purposes of boring, etc. The lists are arranged by States, and the States are arranged alphabetically. A second, revised, edition was published in 1905 as Water-Supply Paper 149 (q. v.). 5c.

*78. Preliminary report on artesian basins in southwestern Idaho and southeastern Oregon, by I. C. Russell. 1903. 53 pp., 2 pls. 5c.

Discusses briefly the rocks and geologic structure of a part of the Snake River Plains in Canyon and Owyhee counties, Idaho, and Malheur and Harney counties, Oreg.; describes briefly the conditions on which artesian flow depends, and in some detail the springs and drilled wells in the Lewis, Otis, Harney, and Whitehorse artesian basins; also describes artesian wells in alluvial deposits and discusses the size of drill holes, casings, etc., the preservation of well records, and the importance of laws to control the use of artesian waters; gives list of publications bearing on artesian waters.

93. Proceedings of first conference of engineers of the Reclamation Service, with accompanying papers, compiled by F. H. Newell, chief engineer, 1904. 361 pp. 25c. [Inquiries concerning this report should be addressed to the Reclamation Service.] Contains:

Investigations in Idaho, by D. W. Ross. Describes the irrigable lands in the area drained by Snake River.

Investigations in Oregon, by J. T. Whistler. Mentions the Umatilla, Malheur, and Harney projects.

Work in Washington, by T. A. Noble. Describes the plains of Columbia River.

96. Destructive floods in the United States in 1903, by E. C. Murphy. 1904. 81 pp., 13 pls. 15c.

Gives an account of a flood (commonly spoken of as the "Heppner disaster") on Willow Creek, a tributary of Columbia River, in Morrow County, Oreg.

*103. A review of the laws forbidding pollution of inland waters in the United States, by E. B. Goodell. 1904. 120 pp. [Superseded by No. 152, q. v.]

Cites statutory restrictions of water pollution in Idaho, Nevada, Oregon, Utah, Washington, and Wyoming.

111. Preliminary report on the underground waters of Washington, by Henry Landes. 1905. 85 pp., 1 pl. 10c.

Describes, by counties, the municipal water supplies, deep wells, and springs in the State, giving also for each county a brief account of the climate, rainfall, topography, drainage, and geology.

118. Geology and water resources of a portion of east-central Washington, by F. C. Calkins. 1905. 96 pp., 4 pls. 5c.

Describes briefly the topography, geology, climate, vegetation, grazing, and agriculture on the Columbia Plains and in Kittitas Valley; discusses the streams, springs, and shallow and deep wells.

*122. Relation of the law to underground waters, by D. W. Johnson. 1905. 55 pp. 5c.

Cites legislative acts relating to ground waters in Idaho, Nevada, Oregon, Utah, Washington, and Wyoming.

149. Preliminary list of deep borings in the United States, second edition, with additions, by N. H. Darton. 1905. 175 pp. 10c.

Gives, by States (and within the States by counties), location, depth, diameter, yield, height of water, and other available information, concerning wells 400 feet or more in depth; includes all wells listed in Water-Supply Papers 57 and 61; mentions also principal publications relating to deep borings.

152. A review of the laws forbidding pollution of inland waters in the United States (second edition), by E. B. Goodell. 1905. 149 pp. 10c.

Cites statutory restrictions of water pollution in Idaho, Nevada, Oregon, Utah, Washington, and Wyoming.

*162. Destructive floods in the United States in 1905, with a discussion of flood discharge and frequency and an index to flood literature, by E. C. Murphy and others. 1906. 105 pp., 4 pls. 15c.

Gives estimates (p. 85) of flood discharge and frequency for Boise River at Boise and Weiser River at Weiser, Idaho.

*231. Geology and water resources of the Harney Basin region, Oregon, by G. A. Waring. 1909. 93 pp., 5 pls. 25c.

The greater part of the area covered by this report is in the Great Basin, but a small tract in the northeastern corner is drained by a number of small streams that are tributary to Malheur River.

253. Water powers of the Cascade Range, Part I, Southern Washington, by J. C. Stevens. 1910. 94 pp., 21 pls. 40c.

Discusses conditions governing hydraulic development, water laws of Washington, and variations in streams; describes the drainage basins of Klickitat, White Salmon, Little White Salmon, Lewis, and Toutle rivers; gives results of observations at gaging stations, and estimates of average minimum discharge and of the available horsepower at the power sites.

274. Some stream waters of the western United States, with chapters on sediment carried by the Rio Grande and the industrial application of water analyses, by Herman Stabler. 1911. 188 pp. 15c.

Describes collection of samples, plan of analytical work, and methods of analyses; discusses soap-consuming power of waters, water softening, boiler waters, and water for irrigation; gives results of analyses of waters of Boise, Malheur, Payette, and Palouse rivers, and Salmon Creek

313. Water powers of the Cascade Range, Part II, Cowlitz, Nisqually, Puyallup, White, Green, and Cedar drainage basins, by F. F. Henshaw and G. L. Parker. 1913. 170 pp., 16 pls. 55c.

Describes the geologic features and history of the drainage basins, topography and drainage, soils and vegetation, and precipitation; gives stream-flow records and discusses water powers storage, and power sites; discusses also natural resources and harbors of the Pacific coast, central electric stations, and power utilization, and gives commercial and residential rates. See also 253.

316. Geology and water resources of a portion of south-central Washington, by G. A. Waring. 1913. 46 pp., 1 pl. 5c.

Describes settlements, climate and vegetation, agriculture, grazing, geographic provinces, relation of surface features and structure, and geology; discusses shallow and artesian waters and irrigation enterprises in Sunnyside and Reservation valleys, Horse Heaven Plateau, and the Columbia River Plains, and irrigation along lower Yakima River; gives tabulated data concerning wells and springs.

339. Quality of the surface waters of Washington, by Walton Van Winkle. 1914. 105 pp., 2 pls. 15c.

Discusses briefly the natural and economic features of the State, the constituents and uses of the natural waters, purification of water, methods of analysis, and industrial and geochemical interpretation of the results of analysis; describes the general features of the principal drainage basins and gives the results of an investigation of the character of the river waters; treats briefly of the average chemical composition of river water, the economic value of the rivers, denudation, and the influence of natural features on the character of the waters.

344. Deschutes River, Oregon, and its utilization, by F. F. Henshaw, John H. Lewis, and E. J. McCaustland. 1914. 200 pp., 28 pls. 50c.

A report, prepared in cooperation with the State of Oregon, containing the results of measurements of stream flow, a discussion of the economic distribution of the water, and chapters on the quality of the water, the availability of the water supply, the developed water powers, undeveloped power sites, water rights and appropriations, the relation of the Federal Government to the development of water power, and Government permits for power and reservoir sites.

346. Profile surveys in the basin of Clark Fork of Columbia River, Montana-Idaho-Washington, prepared under the direction of R. B. Marshall, chief geographer. 1914. 6 pp., 3 pls. (22 sheets). 50c.

347. Profile surveys in Snake River basin, Idaho, prepared under the direction of R. B. Marshall, chief geographer. 1914. 12 pp., 3 pls. (37 sheets). 55c.

348. Profile surveys in Hood and Sandy River basins, Oregon, prepared under the direction of R. B. Marshall, chief geographer. 1914. 8 pp., 2 pls. (6 sheets). 30c.

349. Profile surveys in Willamette River, Oregon, prepared under the direction of R. B. Marshall, chief geographer. 1914. 8 pp., 3 pls. (16 sheets). 30c.

363. Quality of the surface waters of Oregon, by W. Van Winkle. 1914. 137 pp., 2 pls. 20c.

Describes the topography, drainage, rocks and soils, climate, population, and industries of the State, the constituents of natural waters, water for domestic and industrial uses, and purification of water, methods of analysis, and interpretation of results of analysis; describes the general features of the river basins and the character of the river waters; discusses the conditions influencing the quality of the surface waters, average chemical composition, geochemical character, denudation, industrial value, and value for irrigation.

364. Water analyses from the laboratory of the United States Geological Survey, tabulated by F. W. Clarke, chief chemist. 1914. 40 pp. 5c.

Contains analyses of Soap and Omak lakes, Wash., and of mine waters from Butte, Mont.

366. Profile surveys of Snoqualmie, Sultan, and Skykomish rivers, Washington, prepared under the direction of R. B. Marshall, chief geographer. 1914. 7 pp., 3 pls. (12 sheets). 20c.

368. Profile surveys in Wenatchee River basin, Washington, prepared under the direction of R. B. Marshall, chief geographer. 1914. 7 pp., 1 pl. (8 sheets). 20c.

369. Water powers of the Cascade Range, Part III, Yakima River basin, by G. L. Parker and F. B. Storey, 1916. 169 pp., 20 pls 45c.

Describes the geography of the basins, the geologic history, physiography and river history, climate, settlement, and development, population, and transportation; gives stream-flow records and discusses natural conditions affecting stream flow, storage reservoirs, developed and undeveloped power sites; treats also of the industrial development of the region, discussing irrigation by gravity systems and by pumping, the production of coal and other minerals, and manufacturing; presents a scheme of development and utilization of stored water. The report was prepared under the direction of the Washington State Board of Geological Survey, and is based on data consisting of "stream-flow records, river plans and profiles, reservoir surveys, and field reconnaissances of the rivers and their various tributaries," obtained by the United States Geological Survey and the United States Reclamation Service, supplemented by a large amount of information furnished by private parties.

370. Surface water supply of Oregon, 1878–1910, by F. F. Henshaw and H. J. Dean. 1915. 829 pp., 1 pl. 45c.

Describes briefly the natural features of Oregon and in greater detail the general features of the river basins; consists principally of records of stream flow that have been carefully studied and recomputed when necessary to insure their best possible interpretation.

376. Profile surveys in Chelan and Methow River basins, Washington, prepared under the direction of R. B. Marshall, chief geographer. 1915. 8 pp., 5 pls. 15c.

377. Profile surveys in Spokane River basin, Washington, and John Day River basin, Oregon, prepared under the direction of R. B. Marshall, chief geographer. 1915. 7 pp., 10 pls. 15c.

378. Profile surveys in 1914 on Middle Fork of Willamette River and White River, Oregon, prepared under the direction of R. B. Marshall, chief geographer. 1915. 8 pp., 6 pls. 15c.

379. Profile surveys in 1914 in Umpqua River basin, Oregon, prepared under the direction of R. B. Marshall, chief geographer. 1915. 7 pp., 13 pls. 20c.

*400. Contributions to the hydrology of the United States, 1916, Nathan C. Grover, chief hydraulic engineer, 1917. 108 pp., 7 pls. 15c. Contains:

(*b*) Artesian water for irrigation in Little Bitterroot Valley, Mont., by O. E. Meinzer.

419. Profile surveys in 1915 in Skagit River basin, Washington, prepared under the direction of W. H. Herron, acting chief geographer. 1916. 8 pp., 12 pls. 15c.

420. Profile surveys along Henrys Fork, Idaho, and Logan River and Blacksmith Fork, Utah. prepared under the direction of W. H. Herron, acting chief geographer. 1916. 8 pp., 10 pls. 10c.

425. Contributions to the hydrology of the United States, 1917, N. C. Grover, chief hydraulic engineer, 1918. Contains:

(*e*) Ground water in Quincy Valley, Wash., by A. T. Schwennesen and O. E. Meinzer.

BULLETINS.

An asterisk (*) indicates that the Geological Survey's stock of the paper is exhausted. Many of the papers so marked may be purchased from the SUPERINTENDENT OF DOCUMENTS, WASHINGTON, D. C. Bulletins are of octavo size.

*199. Geology and water resources of the Snake River Plains of Idaho, by I. C. Russell. 1902. 192 pp., 25 pls. 25c.

Describes the topography, geology, climate, vegetation, fauna, and soils of an area extending entirely across the southern part of Idaho; discusses streams, springs, water powers, irrigation and agriculture, industries, and routes of transportation and highways; treats of the origin of surface and subsurface waters, the requisite conditions for artesian wells and the quantity of water available.

252. Preliminary report on the geology and water resources of central Oregon, by I. C. Russell. 1905. 138 pp., 24 pls. 15c.

Describes a portion of the extreme northern part of the Great Basin and a part of the drainage area of Deschutes River and its principal tributary, Crooked River; gives an account of the topography, drainage, rainfall and temperature, winds, and forests; describes the volcanicsedimentary rock formations, and discusses by counties the geology and topography, the surface and ground waters; treats of artesian conditions in the Deschutes basin and makes suggestions concerning artesian-well records.

*264. Record of deep-well drilling for 1904, by M. L. Fuller, E. F. Lines, and A. C. Veatch. 1905. 106 pp. 10c.

*298. Record of deep-well drilling for 1905, by M. L. Fuller and Samuel Sanford. 1906. 299 pp. 25c.

Bulletins 264 and 298 give an account of progress in the collection of well records and samples, and contain tabulated records of wells in Idaho, Montana, Nevada, Oregon, Washington, and Wyoming. No. 298 gives detailed records of wells in Flathead County, Mont., and Benton, Jefferson, and Walla Walla counties, Wash. The wells of which detailed sections are given were selected because they afford valuable stratigraphic information.

ANNUAL REPORTS.

Each of the papers contained in the annual reports was also issued in separate form.

Annual reports are distributed free by the Geological Survey as long as its stock lasts. An asterisk (*) indicates that this stock has been exhausted. Many of the papers so marked, however, may be purchased from the SUPERINTENDENT OF DOCUMENTS, WASHINGTON, D. C.

*Tenth Annual Report of the Director of the United States Geological Survey, 1888–89, J. W. Powell, Director. 1890. 2 parts. *Pt. II. Irrigation, viii, 123 pp. 35c.

Makes a preliminary report on the organization and prosecution of the survey of the arid lands for purposes of irrigation; includes an account of the methods of topographic and hydraulic work, the segregation work on reservoir sites and irrigable lands, field and office methods, and brief descriptions of the topography of some of the river basins.

Eleventh Annual Report of the United States Geological Survey, 1889–90, J. W. Powell, Director. 1891. 2 parts. Pt. II. Irrigation, xiv, 395 pp. 30 pls. and maps. $1.25. Contains:

*Hydrography, pp. 1-110. Discusses scope of work, methods of stream measurement, rainfall and evaporation, and describes the more important streams.

*Engineering, pp. 111-200. Defines the scope of the work and gives an account of the survey in the Sun River basin and in the Arkansas, Rio Grande, California, Lahontan, Utah, and Snake River divisions.

*Topography, pp. 291–343. Comprises reports of the topographic surveys in California, Nevada, Colorado, Idaho, Montana, and New Mexico, and a report on reservoir sites.

*Irrigation literature, pp. 345–388. Gives a list of books and pamphlets on irrigation and allied subjects, mainly contained in the library of the United States Geological Survey.

Twelfth Annual Report of the Director of the United States Geological Survey, 1890–91, J. W. Powell, Director. 1891. 2 parts. Pt. II, Irrigation, xviii, 576 pp., 93 pls. $2. Contains:

*Hydrography of the arid regions, by F. H. Newell, pp. 213–361, Pls. 58–106. Discusses the available water supply of the arid regions, the duty of water, flood waters, relation of rainfall to river flow; classifies the drainage basins; and describes the rivers of the Missouri, Arkansas, Rio Grande, Colorado, Sacramento, and San Joaquin basins, and the principal streams of the Great Basin in Nevada and Utah and the Snake River basin.

Thirteenth Annual Report of the United States Geological Survey, 1891–92, J. W. Powell, Director. 1892. (Pts. II and III, 1893.) 3 parts. *Pt. III. Irrigation, xi, 486 pp., 77 pls. $1.85. Contains:

*Engineering results of irrigation survey, by H. M. Wilson, pp. 351–427, Pls. 147–182. Describes structures on the Pocatello canal, Idaho.

Sixteenth Annual Report of the United States Geological Survey, 1894–95, Charles D. Walcott, Director. 1896. (Pts. II, III, and IV, 1895.) 4 parts. *Pt. II. Papers of an economic character, xix, 598 pp., 43 pls. $1.25. Contains:

The public lands and their water supply, by F. H. Newell, pp. 457–533, Pls. 35–39. Describes general character of the public lands, the lands disposed of (railroad, grant, and swamp lands, and private miscellaneous entries), lands reserved (Indian, forest, and military reservations), the vacant lands, and the rate of disposal of vacant lands; discusses the streams, wells, and reservoirs as sources of water supply; gives details for each State.

Nineteenth Annual Report of the United States Geological Survey, 1897–98, Charles D. Walcott, Director. 1898. (Pts. II, III, and V, 1899.) 6 parts in 7 vols. and separate case for maps with Pt. V. *Pt. V, Forest reserves, xvii, 400 pp., 110 pls. $1.25. 16 maps in separate case, 75c. Contains:

*Priest River Forest Reserve, by J. B. Leiberg, pp. 217–252, Pls. 48–61.
*Bitterroot Forest Reserve, by J. B. Leiberg, pp. 253–282, Pls. 62–73.
*Washington Forest Reserve, by H. B. Ayres, pp. 283–313, Pls. 76–100.
*Eastern part of Washington Forest Reserve, by M. W. Gorman, pp. 315–350, Pl. 101.
*Forest conditions of northern Idaho, by J. B. Leiberg, pp. 373–386, Pls. 109–110.
These reports describe the topography and the streams of the forest reserves.

Twentieth Annual Report of the United States Geological Survey, 1898–99, Charles D. Walcott, Director. 1899. (Pts. II, III, IV, V, and VII, 1900.) 7 parts in 8 vols. and separate case for maps with Pt. V. *Pt. V, Forest reserves, xix, 498 pp., 159 pls., 8 maps in separate case. $2.80. Contains:

*The Flathead Forest Reserve, by H. B. Ayres, pp. 245–316, Pls. 77–113.

*Bitterroot Forest Reserve, by J. B. Leiberg, pp. 317–409, Pls. 115–142. Contains brief descriptions of the streams and lakes in the reserves.

Twenty-first Annual Report of the United States Geological Survey, 1899–1900, Charles D. Walcott, Director. 1900. (Pts. III, IV, VI, VI continued, and VII, 1901.) 7 parts in 8 vols. and separate case for maps with Pt. V. *Pt. V, Forest reserves, 711 pp., 143 pls., 39 maps in separate case. $3.85. Contains:

*Mount Rainier Forest Reserve, Washington, by F. G. Plummer, pp. 81–143, Pls. 33–50.

*Olympic Forest Reserve, Washington, from field notes by Arthur Dodwell and T. F. Rixon, pp. 145–208, Pls. 51–70.

*Cascade Range Forest Reserve, Oregon, from T. 28 S. to T. 37 S., inclusive, together with the Ashland Forest Reserve and adjacent forest regions from T. 28 S. to T. 41 S., inclusive, and from R. 2 W. to R. 14 E., Willamette meridian, inclusive, by J. B. Leiberg, pp. 209–498, Pls. 71–84. Contains descriptions of many of the streams flowing through the forest reserves.

GEOLOGIC FOLIOS.

Under the plan adopted for the preparation of a geologic map of the United States the entire area is divided into small quadrangles, bounded by certain meridians and parallels, and these quadrangles, which number several thousand, are separately surveyed and mapped.[1] The unit of survey is also the unit of publication, and the maps and description of each quadrangle are issued in the form of a folio. When all the folios are completed they will constitute the Geologic Atlas of the United States.

A folio is designated by the name of the principal town or of a prominent natural feature within the quadrangle. Each folio includes maps showing the topography, geology, underground structure, and mineral deposits of the area mapped and several pages of descriptive text. The text explains the maps and describes the topographic and geologic features of the country and its mineral products. The topographic map shows roads, railroads, waterways, and, by contour lines, the shapes of the hills and valleys and the height above sea level of all points in the quadrangle. The areal-geology map shows the distribution of the various rocks at the surface. The structural-geology map shows the relations of the rocks to one another underground. The economic-geology map indicates the location of mineral deposits that are commercially valuable. The artesian-water map shows the depth to underground-water horizons. Economic-geology and artesian-water maps are included in folios if the conditions in the areas mapped warrant their publication. The folios are of special interest to students of geography and geology and are valuable as guides in the development and utilization of mineral resources.

The folios numbered from 1 to 163, inclusive, are published in only one form (18 by 22 inches), called the library edition. Some of the folios that bear numbers higher than 163 are published also in an octavo edition (6 by 9 inches). Owing to a fire in the Geological Survey Building May 18, 1913, the stock of geologic folios was more or less damaged by fire and water, but the folios are usable and are sold at the uniform price of 5 cents each, with no reduction for wholesale orders. This rate applies to folios in stock from 1 to 184, inclusive (except reprints), also the library edition of folio 186. The library edition of folios 185, 187, and higher numbers sells for 25 cents a copy, except that some folios which contain an unusually large amount of matter sell at higher prices. The octavo edition of folio 185 and higher numbers sells for 50 cents a copy except folio 193, which sells for 75 cents a copy. If 34 folios selling at 25 cents each (or their equivalent in higher-priced folios) are ordered at one time a discount of 40 per cent is allowed; $5.10 is the minimum amount accepted at this rate.

All the folios contain descriptions of the drainage of the quadrangles. The folios in the following list contain also brief discussions of the underground waters in connection with the economic resources of the areas and more or less information concerning the utilization of the water resources.

An asterisk (*) indicates that the stock of the folio is exhausted.

*45. Boise, Idaho.

Describes geography and geology, cold springs and cold artesian waters, and hot springs and hot artesian waters.

103. Nampa, Idaho-Oregon. 5c.

Describes the relief, drainage, climate, and vegetation of the area; discusses the geologic history and geologic formations, and, under "Economic geology," the surface waters available for irrigation, the springs and shallow wells, and the artesian wells; indicates areas of possible artesian flow.

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[1] Index maps showing areas in the North Pacific slope basins covered by topographic maps and by geologic folios will be mailed on receipt of request addressed to the Director, U. S. Geological Survey, Washington, D. C.

104. Silver City, Idaho. 5c.

Describes the relief, drainage, climate, vegetation, and culture of the Silver City quadrangle; discusses the geologic history and the geologic formations, and, under "Economic geology," the surface waters available for irrigation or water-power development, warm springs, and artesian wells; notes possible chances for artesian waters; gives records of wells near Enterprise and Guffey; see also Water-Supply Paper 78.

*139. Snoqualmie, Washington.

Describes the relief and drainage of an area including portions of Kittitas, Yakima, Pierce, and King counties; the statigraphic, structural, and historical geology, and, under "Economic geology," includes a brief paragraph on the utilization of the water supply.

MISCELLANEOUS REPORTS.

Other Federal bureaus and State and other organizations have from time to time published reports relating to the water resources of various sections of the country. Notable among those pertaining to the northern Pacific coast drainage basins are the reports of the commissioner of conservation of the State of Montana; the State land commission; the State engineer of Idaho; the Bureau of Industry, Agriculture, and Irrigation of Nevada; the State engineers of Nevada, Oregon, Utah, and Washington; the annual reports of the United States Reclamation Service; and the reports of the Chief of Engineers, U. S. Army. The following reports deserve special mention:

The Oregon system of water titles, by John H. Lewis: Oregon State Engineer Bull. 2, 1912.

State and National water laws, with a detailed statement of the Oregon system of water titles, by John H. Lewis, with a discussion by Clarence T. Johnston and L. J. Le Conte: Am. Soc. Civil Eng. Trans., vol. 76, pp. 637–758, 1913.

Report of the commission on conservation [State of Montana] on bills relating to public lands, water rights, and the protection and preservation of the forests: Helena, 1911; also report of the governor of the State of Montana on the same subject.

How to appropriate the public waters of the State of Nevada, compiled by W. M. Kearney, State engineer, 1911.

Requirements and regulations, including suggestions and instructions in relation to the appropriation, use, and measurement of water in the State of Nevada: State engineer of Nevada, 1912.

Irrigation pumping in Nevada, etc., by Charles Norcross: Nevada Bur. of Industry, Agr., and Irr. Bull. 8, 1913.

The water resources of Washington: Potable and mineral water, by H. G. Byers; artesian water, by C. A. Ruddy; water power, by R. E. Heine: Washington Geol. Survey Ann. Rept. for 1901, vol. 1, pt. 5, 1902.

Preliminary report on the Quincy Valley irrigation project, by Henry Landes and others: Washington Geol. Survey Bull. 14, 1912.

Biennial Report of the State Commissioner of Arid Lands [Washington], 1895–96 and 1897–98.

The irrigated lands of the State of Washington, by George M. Allen, deputy commissioner: State Bureau of Statistics and Immigration, 1910.

Irrigation laws of the State of Wyoming, prepared for publication in the office of the State engineer, 1909.

GEOLOGICAL SURVEY HYDROLOGIC REPORTS OF GENERAL INTEREST.

The following list comprises reports not readily classifiable by drainage basins and covering a wide range of hydrologic investigations:

WATER-SUPPLY PAPERS.

*1. Pumping water for irrigation, by H. M. Wilson. 1896. 56 pp., 9 pls.

Describes pumps and motive powers, windmills, water wheels, and various kinds of engines; also storage reservoirs to retain pumped water until needed for irrigation.

*3. Sewage irrigation, by G. W. Rafter. 1897. 100 pp., 4 pls. (See Water-Supply Paper 22.) 10c.

Discusses methods of sewage disposal by intermittent filtration and by irrigation; describes utilization of sewage in Germany, England, and France, and sewage purification in the United States.

*8. Windmills for irrigation, by E. C. Murphy. 1897. 49 pp., 8 pls. 10c.

Gives results of experimental tests of windmills during the summer of 1896 in the vicinity of Garden, Kans.; describes instruments and methods and draws conclusions.

*14. New tests of certain pumps and water lifts used in irrigation, by O. P. Hood, 1898. 91 pp., 1 pl.

Discusses efficiency of pumps and water lifts of various types.

*20. Experiments with windmills, by T. O. Perry. 1899. 97 pp., 12 pls. 15c.

Includes tables and descriptions of wind wheels, compares wheels of several types, and discusses results.

*22. Sewage irrigation, Part II, by G. W. Rafter. 1899. 100 pp., 7 pls. 15c.

Gives résumé of Water-Supply Paper 3; discusses pollution of certain streams, experiments on purification of factory wastes in Massachusetts, value of commercial fertilizers, and describes American sewage-disposal plants by States; contains bibliography of publications relating to sewage utilization and disposal.

*41. The windmill, its efficiency and economic use, Part I, by E. C. Murphy. 1901. 72 pp., 14 pls. 5c.

*42. The windmill, its efficiency and economic use, Part II, by E. C. Murphy. 1901. 75 pp. (73–147), 2 pls., (15–16). 10c.

Nos. 41 and 42 give details of results of experimental tests with windmills of various types

*43. Conveyance of water in irrigation canals, flumes, and pipes, by Samuel Fortier. 1901. 86 pp., 15 pls. 15c.

*56. Methods of stream measurement. 1901. 51 pp., 12 pls. 15c.

Describes the methods used by the Survey in 1901–2. See also Nos. 64, 94, and 95.

*64. Accuracy of stream measurements, by E. C. Murphy. 1902. 99 pp., 4 pls. (See No. 95.) 10c.

Describes methods of measuring velocity of water and of measuring and computing stream flow and compares results obtained with the different instruments and methods; describes also experiments and results at the Cornell University hydraulic laboratory. A second, enlarged, edition published as Water-Supply Paper 95.

*67. The motions of underground waters, by C. S. Slichter. 1902. 106 pp., 8 pls. 15c.

Discusses origin, depth, and amount of ground waters; permeability of rocks and porosity of soils; causes, rates, and laws of motions of ground water; surface and deep zones of flow, and recovery of waters by open wells and artesian and deep wells; treats of the shape and position of the water table; gives simple methods of measuring yield of flowing well; describes artesian wells at Savannah, Ga.

72. Sewage pollution in the metropolitan area near New York City and its effect on inland water resources, by M. O. Leighton. 1902. 75 pp., 8 pls. 10c.

Defines "normal" and "polluted" waters and discusses the damage resulting from pollution.

*80. The relation of rainfall to run-off, by G. W. Rafter. 1903. 104 pp. 10c.

Treats of measurements of rainfall and laws and measurements of stream flow; gives rainfall, run-off, and evaporation formulas; discusses effects of forests on rainfall and run-off.

87. Irrigation in India (second edition), by H. M. Wilson. 1903. 238 pp., 27 pls. 25c.

First edition was published in Part II of the Twelfth Annual Report.

93. Proceedings of first conference of engineers of the Reclamation Service, with accompanying papers, compiled by F. H. Newell, chief engineer. 1904. 361 pp. 25c. [Requests for this paper should be addressed to the U. S. Reclamation Service.]

Contains, in addition to an account of the organization of the hydrographic [water-resources] branch of the United States Geological Survey and the reports of the conference, the following papers of more or less general interest:

Limits of an irrigation project, by D. W. Ross.
Relation of Federal and State laws to irrigation, by Morris Bien.
Electrical transmission of power for pumping, by H. A. Storrs.
Correct design and stability of high masonry dams, by Geo. Y. Wisner.
Irrigation surveys and the use of the plane table, by J. B. Lippincott.
The use of alkaline waters for irrigation, by Thomas H. Means.

*94. Hydrographic manual of the United States Geological Survey, prepared by E. C. Murphy, J. C. Hoyt, and G. B. Hollister. 1904. 76 pp., 3 pls. 10c.

Gives instruction for field and office work relating to measurements of stream flow by current meters. See also No. 95.

*95. Accuracy of stream measurements (second, enlarged edition), by E. C. Murphy. 1904. 169 pp., 6 pls.

Describes methods of measuring and computing stream flow and compares results derived from different instruments and methods. See also No. 94.

*103. A review of the laws forbidding pollution of inland waters in the United States, by E. B. Goodell. 1904. 120 pp. (See No. 152.)

Explains the legal principles under which antipollution statutes become operative, quotes court decisions to show authority for various deductions, and classifies according to scope the statutes enacted in the different States.

110. Contributions to the hydrology of eastern United States, 1904; M. L. Fuller, geologist in charge. 1905. 211 pp., 5 pls. 10c.

Contains the following reports of general interest. The scope of each paper is indicated by its title.

Description of underflow meter used in measuring the velocity and direction of underground water, by Charles S. Slichter.

The California or "stovepipe" method of well construction, by Charles S. Slichter.

Approximate methods of measuring the yield of flowing wells, by Charles S. Slichter.

Corrections necessary in accurate determinations of flow from vertical well casings, from notes furnished by A. N. Talbot.

Experiments relating to problems of well contamination at Quitman, Ga., by S. W. McCallie.

113. The disposal of strawboard and oil-well wastes, by R. L. Sackett and Isaiah Bowman. 1905. 52 pp., 4 pls. 5c.

The first paper discusses the pollution of streams by sewage and by trade wastes, describes the manufacture of strawboard, and gives results of various experiments in disposing of the waste. The second paper describes briefly the topography, drainage, and geology of the region about Marion, Ind., the contamination of rock wells and of streams by waste oil and brine.

*114. Underground waters of eastern United States; M. L. Fuller, geologist in charge. 1905. 285 pp., 18 pls. 25c.

Contains report on "Occurrence of underground waters," by M. L. Fuller, discussing sources amount, and temperature of waters, permeability and storage capacity of rocks, water-bearing formations, recovery of water by springs, wells, and pumps, essential conditions of artesian flows, and general conditions affecting ground waters in eastern United States.

119. Index to the hydrographic progress reports of the United States Geological. Survey, 1888 to 1903, by J. C. Hoyt and B. D. Wood. 1905. 253 pp. 15c.

120. Bibliographic review and index of papers relating to underground waters published by the United States Geological Survey, 1879–1904, by M. L. Fuller. 1905. 128 pp. 10c.

*122. Relation of the law to underground waters, by D. W. Johnson. 1905. 55 pp. 5c

Defines and classifies underground waters, gives common-law rules relating to their use, and cites State legislative acts affecting them.

140. Field measurements of the rate of movement of underground waters, by C. S. Slichter. 1905. 122 pp., 15 pls. 15c.

Discusses the capacity of sand to transmit water, describes measurements of underflow in Rio Hondo, San Gabriel, and Mohave River valleys, Cal., and on Long Island, N. Y., gives results of tests of wells and pumping plants, and describes stovepipe method of well construction.

143. Experiments on steel-concrete pipes on a working scale, by J. H. Quinton. 1905. 61 pp., 4 pls. 5c.

Scope indicated by title.

145. Contributions to the hydrology of eastern United States, 1905; M. L. Fuller, geologist in charge. 1905. 220 pp., 6 pls. 10c.

Contains brief reports of general interest as follows:

Drainage of ponds into drilled wells, by Robert E. Horton.. Discusses efficiency, cost, and capacity of drainage wells, and gives statistics of such wells in southern Michigan.

Construction of so-called fountain and geyser springs, by Myron L. Fuller.

A convenient gage for determining low artesian heads, by Myron L. Fuller.

146. Proceedings of second conference of engineers of the Reclamation Service, with accompanying papers, compiled by F. H. Newell, chief engineer. 1905. 267 pp. 15 c. [Inquiries concerning this report should be addressed to the U. S. Reclamation Service.]

Contains brief account of the organization of the hydrographic [water-resources] branch and the Reclamation Service, reports of conferences and committees, circulars of instruction, and many brief reports on subjects closely related to reclamation, and a bibliography of technical papers by members of the service. Of the papers read at the conference those listed below (scope indicated by title) are of more or less general interest:

Proposed State code of water laws, by Morris Bien.
Power engineering applied to irrigation problems, by O. H. Ensign.
Estimates on tunneling in irrigation projects, by A. L. Fellows.
Collection of stream-gaging data, by N. C. Grover.
Diamond-drill methods, by G. A. Hammond.
Mean-velocity and area curves, by F. W. Hanna.
Importance of general hydrographic data concerning basins of streams gaged by R. E. Horton
Effect of aquatic vegetation on stream flow, by R. E. Horton.
Sanitary regulations governing construction camps, by M. O. Leighton.
Necessity of draining irrigated land, by Thos. H. Means.
Alkali soils, by Thos. H. Means.

Cost of stream-gaging work, by E. C. Murphy.
Equipment of a cable gaging station, by E. C. Murphy.
Silting of reservoirs, by W. M. Reed.
Farm-unit classification, by D. W. Ross.
Cost of power for pumping irrigating water, by H. A. Storrs.
Records of flow at current-meter gaging stations during the frozen season, by F. H. Tillinghast.

147. Destructive floods in the United States in 1904, by E. C. Murphy and others. 1905. 206 pp., 18 pls. 15c.

Contains a brief account of "A method of computing cross-section area of waterways," including formulas for maximum discharge and area of cross section.

*150. Weir experiments, coefficients, and formulas, by R. E. Horton. 1906. 189 pp., 38 pls. (See Water-Supply Paper 200.) 15c.

Scope indicated by title.

151. Field assay of water, by M. O. Leighton. 1905. 77 pp., 4 pls.

Discusses methods, instruments, and reagents used in determining turbidity, color, iron, chlorides, and hardness in connection with the studies of the quality of water in various parts of the United States.

152. A review of the laws forbidding pollution of inland waters in the United States (second edition), by E. B. Goodell. 1905. 149 pp. 10c.

Scope indicated by title.

*155. Fluctuations of the water level in wells, with special reference to Long Island, N. Y., by A. C. Veatch. 1906. 83 pp., 9 pls. 25c.

Includes general discussion of fluctuation changes due to rainfall and evaporation, barometric changes, temperature changes, changes in rivers, changes in lake level, tidal changes, effects of settlement, irrigation, dams, underground-water developments, and to indeterminate causes.

*160. Underground-water papers, 1906; M. L. Fuller, geologist in charge. 1906. 104 pp., 1 pl.

Gives account of work in 1905; lists publications relating to ground waters, and contains the following brief reports of general interest:

Significance of the term "artesian," by Myron L. Fuller.
Representation of wells and springs on maps, by Myron L. Fuller.
Total amount of free water in the earth's crust, by Myron L. Fuller.
Use of fluorescein in the study of underground waters, by R. B. Dole.
Problems of water contamination, by Isaiah Bowman.
Instances of improvement of water in wells, by Myron L. Fuller.

*162. Destructive floods in the United States in 1905, with a discussion of flood discharge and frequency and an index to flood literature, by E. C. Murphy and others. 1906. 105 pp., 4 pls. 15c.

*163. Bibliographic review and index of underground-water literature published in the United States in 1905, by M. L. Fuller, F. G. Clapp, and B. L. Johnson. 1906. 130 pp. 15c.

Scope indicated by title.

*179. Prevention of stream pollution by distillery refuse, based on investigations at Lynchburg, Ohio, by Herman Stabler. 1906. 34 pp., 1 pl. 10c.

Describes grain distillation; treatment of slop; sources, character, and effects of effluents on streams; discusses filtration, precipitation, fermentation, and evaporation methods of disposal of wastes without pollution.

*180. Turbine water-wheel tests and power tables, by R. E. Horton. 1906. 134 pp., 2 pls. 20c.

Scope indicated by title.

*185. Investigations on the purification of Boston sewage, by C.-E. A. Winslow and E. B. Phelps. 1906. 163 pp. 25c.

Discusses composition, disposal, purification, and treatment of sewages and tendencies in sewage-disposal practice in England, Germany, and the United States; describes character of crude sewage at Boston, removal of suspended matter, treatment in septic tanks, and purification in intermittent sand filtration and coarse material; gives bibliography.

*186. Stream pollution by acid-iron wastes, a report based on investigations made at Shelby, Ohio, by Herman Stabler. 1906. 36 pp., 1 pl.

Gives history of pollution by acid-iron wastes at Shelby, Ohio, and resulting litigation; discusses effect of acid-iron liquors on sewage purification processes, recovery of copperas from acid-iron wastes, and other processes for removal of pickling liquor.

*187. Determination of stream flow during the frozen season, by H. K. Barrows and R. E. Horton. 1907. 93 pp., 1 pl. 15c.

Scope indicated by title.

*189. The prevention of stream pollution by strawboard waste, by E. B. Phelps. 1906. 29 pp., 2 pls.

Describes manufacture of strawboard, present and proposed methods of disposal of waste liquors, laboratory investigations of precipitation and sedimentation, and field studies of amount and character of water used, raw material and finished product, and mechanical filtration.

*194. Pollution of Illinois and Mississippi rivers by Chicago sewage (a digest of the testimony taken in the case of the State of Missouri *v.* the State of Illinois and the Sanitary District of Chicago), by M. O. Leighton. 1907. 369 pp., 2 pls.

Scope indicated by amplification of title.

*200. Weir experiments, coefficients, and formulas (revision of paper No. 150), by R. E. Horton. 1907. 195 pp., 38 pls. 35c.

Scope indicated by title.

*226. The pollution of streams by sulphite-pulp waste, a study of possible remedies, by E. B. Phelps. 1909. 37 pp., 1 pl. 10c.

Describes manufacture of sulphite pulp, the waste liquors, and the experimental work leading to suggestions as to methods of preventing stream pollution.

*229. The disinfection of sewage and sewage filter effluents, with a chapter on the putrescibility and stability of sewage effluents, by E. B. Phelps. 1909. 91 pp., 1 pl. 15c.

Scope indicated by title.

*234. Papers on the conservation of water resources. 1909. 96 pp., 2 pls. 15c.

Contains the following papers, whose scope is indicated by their titles: Distribution of rainfall by Henry Gannett; Floods, by M. O. Leighton; Developed water powers, compiled under the direction of W. M. Steuart, with discussion by M. O. Leighton; Undeveloped water powers, by M. O. Leighton; Irrigation, by F. H. Newell; Underground waters, by W. C. Mendenhall; Denudation, by R. B. Dole and Herman Stabler; Control of catchment areas, by H. N. Parker.

*235. The purification of some textile and other factory wastes, by Herman Stabler and G. H. Pratt. 1909. 76 pp. 10c.

Discusses waste waters from wool scouring, bleaching and dyeing cotton yarn, bleaching cotton piece goods, and manufacture of oleomargarine, fertilizer, and glue.

236. The quality of surface waters in the United States, Part I, Analyses of waters east of the one hundredth meridian, by R. B. Dole. 1909. 123 pp. 10c.

Describes collection of samples, methods of examination, preparation of solutions, accuracy of estimates, and expression of analytical results.

238. The public utility of water powers and their governmental regulation, by René Tavernier and M. O. Leighton. 1910. 161 pp. 15c.

Discusses hydraulic power and irrigation, French, Italian, and Swiss legislation relative to the development of water powers, and laws proposed in the French Parliament; reviews work of bureau of hydraulics and agricultural improvements of the French department of agriculture, and gives résumé of Federal and State water-power legislation in the United States

*255. Underground waters for farm use, by M. L. Fuller. 1910. 58 pp., 17 pls. 15c.

Discusses rocks as sources of water supply and the relative safety of supplies from different materials; springs and their protection; open or dug and deep wells, their location, yield, relative cost, protection, and safety; advantages and disadvantages of cisterns and combination wells and cisterns.

*257. Well-drilling methods, by Isaiah Bowman. 1911. 139 pp., 4 pls. 15c.

Discusses amount, distribution, and disposal of rainfall; water-bearing rocks; amount of ground water; artesian conditions; oil and gas bearing formations; gives history of well drilling in Asia, Europe, and the United States; describes in detail the various methods and the machinery used; discusses loss of tools and geologic difficulties, contamination of well waters and methods of prevention, tests of capacity and measurement of depth, and costs of sinking wells.

*258. Underground-water papers, 1910, by M. L. Fuller, F. G. Clapp, G. C. Matson, Samuel Sanford, and H. C. Wolff. 1911. 123 pp., 2 pls. 15c.

Contains the following papers (scope indicated by titles) of general interest:
Drainage by wells, by M. L. Fuller.
Freezing of wells and related phenomena, by M. L. Fuller.
Pollution of underground waters in limestone, by G. C. Matson.
Protection of shallow wells in sandy deposits, by M. L. Fuller.
Magnetic wells, by M. L. Fuller.

*315. The purification of public water supplies, by G. A. Johnson. 1913. 84 pp., 8 pls. 10c.

Discusses ground, lake, and river waters as public supplies, development of waterworks systems in the United States, water consumption, and typhoid fever; describes methods of filtration and sterilization of water and municipal water softening.

334. The Ohio Valley flood of March-April, 1913 (including comparisons with some earlier floods), by A. H. Horton and H. J. Jackson. 1913. 96 pp., 22 pls. 20c.

Although relating specifically to floods in the Ohio Valley, this report discusses also the causes of floods and the prevention of damage by floods.

337. The effects of ice on stream flow, by William Glenn Hoyt. 1913. 77 pp., 7 pls. 15c.

Discusses methods of measuring the winter flow of streams.

*345. Contributions to the hydrology of the United States, 1914; N. C. Grover, chief hydraulic engineer. 1915. 225 pp., 17 pls. 30c. Contains:

(e) A method of determining the daily discharge of rivers of variable slope, by M. R. Hall, W. E. Hall, and C. H. Pierce, pp. 53-65.

364. Water analyses from the laboratory of the United States Geological Survey, tabulated by F. W. Clarke, chief chemist. 1914. 40 pp. 5c.

Contains analyses of waters from rivers, lakes, wells, and springs in various parts of the United States, including analyses of the geyser water of Yellowstone National Park, hot springs in Montana, brines from Death Valley, water from the Gulf of Mexico, and mine waters from Tennessee, Michigan, Missouri and Oklahoma, Montana, Colorado and Utah, Nevada and Arizona, and California.

371. Equipment for current-meter gaging stations, by G. J. Lyon. 1915. 64 pp., 37 pls. 20c.

Describes methods of installing automatic and other gages and of constructing gage wells shelters, and structures for making discharge measurements and artificial controls.

*375. Contributions to the hydrology of the United States, 1915; N. C. Grover, chief hydraulic engineer. 1916. 181 pp., 9 pls. 15c. Contains:

(c) The relation of stream gaging to the science of hydraulics, by C. H. Pierce and R. W. Davenport, pp. 77-84.

(e) A method of correcting river discharge for a changing stage, by B. E. Jones, pp. 117-130.

(f) Conditions requiring the use of automatic gages in obtaining records of stream flow, by C. H. Pierce, pp. 131-139.

Three papers presented at the conference of engineers of the water-resources branch in December, 1914.

*400. Contributions to the hydrology of the United States, 1916; N. C. Grover, chief hydraulic engineer. 108 pp., 7 pls. Contains:

(a) The people's interest in water-power resources, by G. O. Smith, pp. 1-8.

(c) The measurement of silt-laden streams, by R. C. Pierce, pp. 39-51.

(d) Accuracy of stream-flow data, by N. C. Grover and J. C. Hoyt, pp. 53-59.

416. The divining rod, a history of water witching, with a bibliography, by Arthur J. Ellis. 1917. 59 pp. 10c.

A brief paper published "merely to furnish a reply to the numerous inquiries that are continually being received from all parts of the country" as to the efficacy of the divining rod for locating underground water.

425. Contributions to the hydrology of the United States, 1917, N. C. Grover, chief hydraulic engineer. 1918. Contains:

*(c) Hydraulic conversion tables and convenient equivalents, pp. 71-94. 1917.

ANNUAL REPORTS.

*Fifth Annual Report of the United States Geological Survey, 1883-84, J. W. Powell, Director. 1885. xxxvi, 469 pp., 58 pls. $2.25. Contains:

*The requisite and qualifying conditions of artesian wells, by T. C. Chamberlin, pp. 125-173, pl. 21. Scope indicated by title.

Twelfth Annual Report of the United States Geological Survey, 1890-91, J. W. Powell, Director. 1891. 2 parts. Pt. II, Irrigation, xviii, 576 pp., 93 pls. $2. Contains:

*Irrigation in India, by H. M. Wilson, pp. 363-561, pls. 107 to 146. See Water-Supply Paper 87.

Thirteenth Annual Report of the United States Geological Survey, 1891-92, J. W. Powell, Director. 1892. (Pts. II and III, 1893.) 3 parts. *Pt. III, Irrigation, xi, 486 pp., 77 pls. $1.85. Contains:

*American irrigation engineering, by H. M. Wilson, pp. 101-349, pls. 111 to 146. Discusses the economical aspects of irrigation, alkaline drainage, silt, and sedimentation; gives brief history of legislation; describes perennial canals in Idaho, California, Wyoming, and Arizona; discusses water storage at reservoirs of the California and other projects, subsurface sources of supply, pumping, and subirrigation.

Fourteenth Annual Report of the United States Geological Survey, 1892-93, J. W. Powell, Director. 1893. (Pt. II, 1894.) 2 parts. *Pt. II, Accompanying papers, xx, 597 pp., 73 pls. $2.10. Contains:

*The potable waters of eastern United States, by W J McGee, pp. 1-47. Discusses cistern water, stream waters, and ground waters, including mineral springs and artesian wells.

*Natural mineral waters of the United States, by A. C. Peale, pp. 49-88, pls. 3 and 4. Discusses the origin and flow of mineral springs, the source of mineralization, thermal springs, the chemical composition and analysis of spring waters, geographic distribution, and the utilization of mineral waters; gives a list of American mineral-spring resorts; contains also some analyses.

Nineteenth Annual Report of the United States Geological Survey, 1897–98, Charles D. Walcott, Director. 1898. (Parts II, III, and V, 1899.) 6 parts in 7 vols. and separate case for maps with Pt. V. *Pt. II, Papers chiefly of a theoretic nature, v, 958 pp., 172 pls. $2.65. Contains:

*Principles and conditions of the movements of ground water, by F. H. King, pp. 59–294, pls. 6 to 16. Discusses the amount of waters stored in sandstone, in soil, and in other rocks, and the depth to which ground water penetrates; gravitational, thermal, and capillary movements of ground waters, and the configuration of the ground-water surface; gives the results of experimental investigations on the flow of air and water through a rigid, porous medium, and through sand, sandstones, and silts; discusses results obtained by other investigators, and summarizes results of observations; discusses also rate of flow of water through sand and rock, the growth of rivers, rate of filtration through soil, interference of wells, etc.

*Theoretical investigation of the motion of ground waters, by C. S. Slichter, pp. 295–384, pl. 17. Scope indicated by title.

PROFESSIONAL PAPERS.

*72. Denudation and erosion in the southern Appalachian region and the Monongahela basin, by L. C. Glenn. 1911. 137 pp., 21 pls. 35c.

Describes the topography, geology, drainage, forests, climate, and population, and transportation facilities of the region, the relation of agriculture, lumbering, mining, and power development to erosion and denudation, and the nature, effects, and remedies of erosion; gives details of conditions in Holston, Nolichucky, French Broad, Little Tennessee, and Hiwassee River basins, along Tennessee River proper, and in the basins of the Coosa-Alabama system, Chattahoochee, Savannah, Saluda, Broad, Catawba, Yadkin, New, and Monongahela rivers.

86. The transportation of débris by running water, by G. K. Gilbert, based on experiments made with the assistance of E. C. Murphy. 1914. 263 pp., 3 pls. 70c.

The results of an investigation which was carried on in a specially equipped laboratory at Berkeley, Cal., and was undertaken for the purpose of learning "the laws which control the movement of bed load and especially to determine how the quantity of load is related to the stream slope and discharge and to the degree of comminution of the débris."

105. Hydraulic-mining débris in the Sierra Nevada, by G. K. Gilbert. 154 pp., 34 pls. 1917. 50c.

Presents the results of an investigation undertaken by the United States Geological Survey in response to a memorial from the California Miners' Association asking that a particular study be made of portions of the Sacramento and San Joaquin valleys affected by detritus from torrential streams. The report deals largely with geologic and physiographic aspects of the subject, traces the physical effects, past and future, of the hydraulic mining of earlier decades, the similar effects which certain other industries induce through stimulation of the erosion of the soil, and the influence of the restriction of the area of inundation by the construction of levees. Suggests cooperation by several interests for the control of the streams now carrying heavy loads of débris.

BULLETINS.

*32. Lists and analyses of the mineral springs of the United States (a preliminary study), by A. C. Peale. 1886. 235 pp.

Defines mineral waters, lists the springs by States, and gives tables of analyses so far as available.

*319. Summary of the controlling factors of artesian flows, by Myron L. Fuller. 1908. 44 pp., 7 pls. 10c.

Describes underground reservoirs, the sources of ground waters, the confining agents, the primary and modifying factors of artesian circulation, the essential and modifying factors of artesian flow, and typical artesian systems.

*479. The geochemical interpretation of water analyses, by Chase Palmer. 1911. 31 pp. 5c.

Discusses the expression of chemical analyses, the chemical character of water and the properties of natural waters; gives a classification of waters based on property values and reacting values, and discusses the character of the waters of certain rivers as interpreted directly from the results of analyses; discusses also the relation of water properties to geologic formations, silica in river water, and the character of the water of the Mississippi and the Great Lakes and St. Lawrence River as indicated by chemical analyses.

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[1] Many of the reports contain brief subject bibliographies. See abstracts.

[2] Many analyses of river ,spring, and well waters are scattered through publications, as noted in abstracts.

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